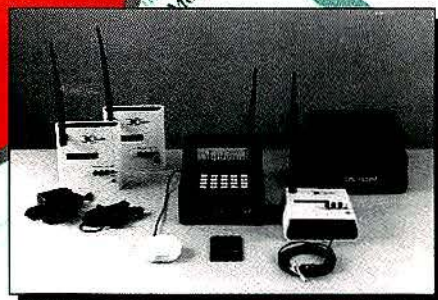


Mobile Radio Technology™

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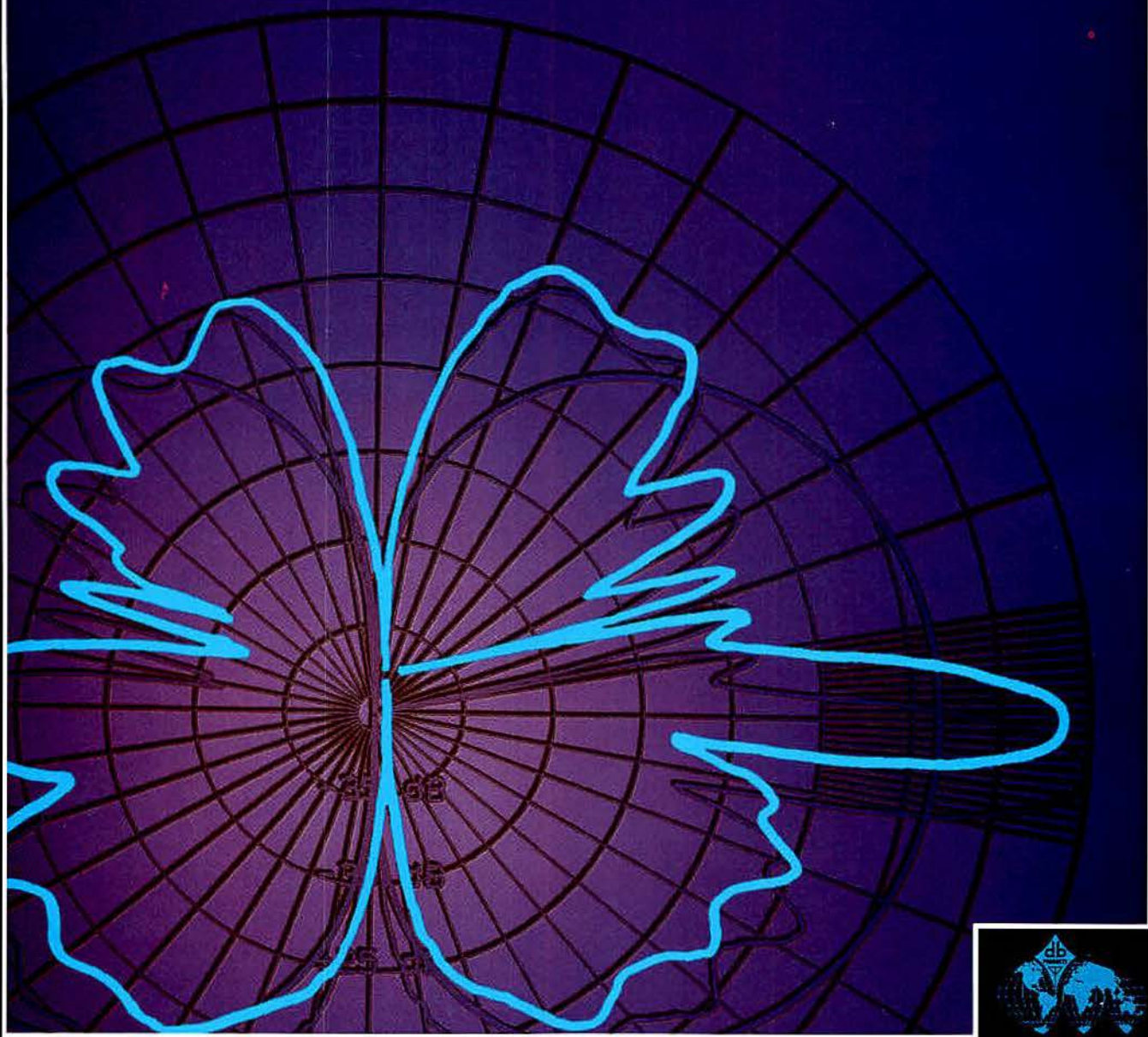
Informational



Including Buyers' Guide:

- Product Directory
- Services Directory
- Brand Names Directory
- Company Addresses
- Index to 1994 Features

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Circle (4) on Fast Fact Card

features

8 1995 Buyers' Guide

MRT's annual directory provides you with essential information you will want to retain for quick reference year-round. Products and services are listed, as well as brand names and company addresses.

12 Product Directory

More than 90 categories of equipment for the mobile radio industry are listed, as well as more than 900 suppliers. Advertisers in this issue are listed in blue.

66 Services Directory

Mobile radio services such as consulting, repair and training are listed, as well as the companies that provide them. Advertisers in this issue are shown in blue ink.

70 Company Addresses

An alphabetized list of more than 900 suppliers and service providers appears in this section. Regional sales contacts are listed for some of the advertisers in this issue.

110 Brand Names Directory

Sort out which company belongs to specific mobile radio industry brand names in this alphabetized listing.

114 Index to 1994 features

An alphabetized author index lists all of the features that each author has written during 1994. All of the 1994 articles plus two departments, *Regulating Technology* and *Technically Speaking*, are indexed by subject. Keep this as a reference to find articles printed in 1994.

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Robert H. Schwaninger Jr.
Close may not count.

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Duplexers.

121 Classified ads

144 Ad index/hot line

Find advertisers quickly.

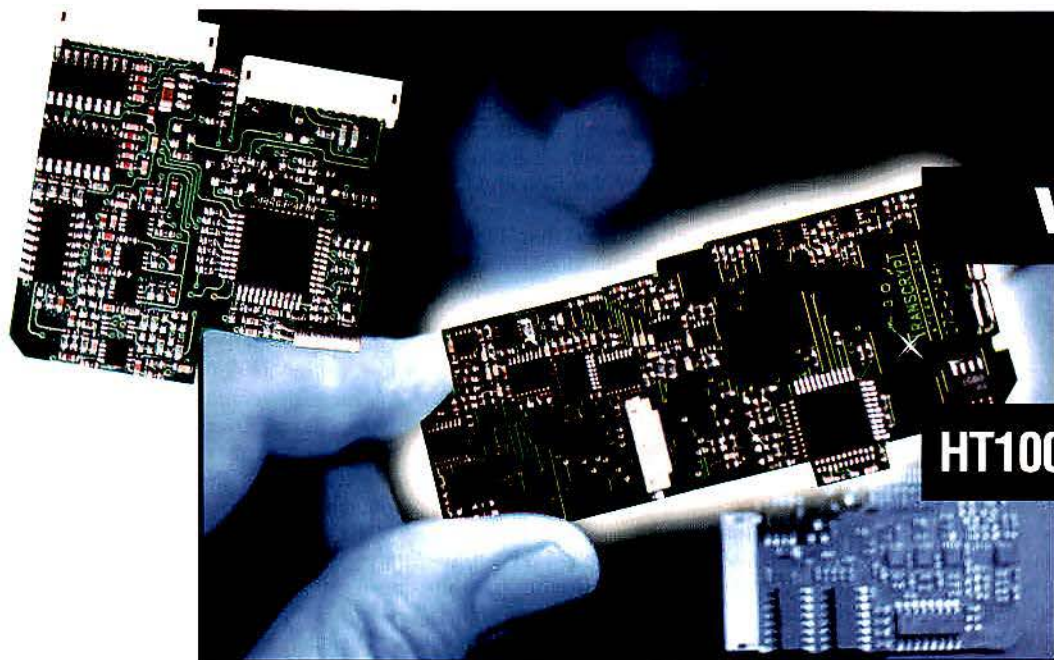
On the cover: MRT's 8th annual Buyers' Guide serves as the year-round reference for buying in 1995. More than 900 companies are listed representing more than 100 categories of products and services.

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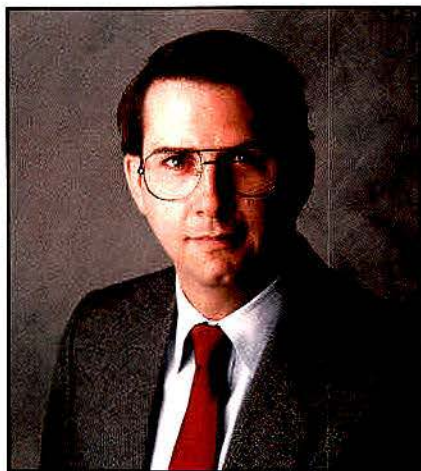
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Circle (5) on Fast Fact Card

Los Angeles radio system operator sues FCC employees for \$2.9 million



A Los Angeles two-way radio dealer and operator of specialized mobile radio (SMR) and private carrier radio communications systems is suing three employees of the FCC's Private Radio Bureau. James A. Kay Jr. complains that W. Riley Hollingsworth, Terry L. Fishel and Anne Marie Wypijewski have violated his rights under the Fourth, Fifth and Eighth Amendments to the U.S. Constitution. He is asking a federal District Court to award him actual and consequential damages of \$900,000 and punitive damages of \$2 million.

In the 10-count, 24-page complaint, Kay contends that Hollingsworth, deputy chief of the bureau's Licensing Division, has failed to act on license applications and petitions that Kay filed with the bureau. He claims that the deputy chief has attempted an unreasonable search of his records. He asserts that Hollingsworth dismissed 22 of his license applications and failed to take timely action on his petitions without due process of law, including failure to designate his applications for hearing. Moreover, Kay alleges that Hollingsworth's dismissal of his applications is a sanction for Kay's opposition to the search of his records that violates both the FCC's own forfeiture standards and Kay's Fifth Amendment rights.

Delaying applications

The complaint states that Hollingsworth, acting in concert with the other defendants, delayed action on Kay's applications without imposing the same

delay on other persons' later-filed applications, causing the FCC to process applications filed later by other persons before processing Kay's. Such an action would be contrary to FCC rules that require all applications in pending status to be processed in the order received and would deny Kay due process of law. Kay charges that Hollingsworth revoked one of Kay's SMR licenses without notice or hearing as required by the Communications Act and FCC rules.

The complaint charges that Fishel, chief of the bureau's Land Mobile Branch, violated several FCC rules involving proof of service, *ex parte* presentations and requirements for referring decisions to the full commission, and that he violated a commission precedent for not attempting to resolve contractual disputes between private parties through the exercise of its licensing authority.

Violation of privacy

Kay contends that Wypijewski, an attorney-at-law and employee of the bureau's Licensing Division, sent copies of a letter written to Kay by Hollingsworth to six private individuals or companies in violation of federal law that Kay claims would require his permission for such a release. The information she is said to have disclosed was distributed within the radio communications industry by one or more of the recipients, which Kay claims caused him substantial harm.

To summarize, Kay states that he is entitled to due process of law before agents of the United States may deprive him of life, liberty or property; to protection from unreasonable search and seizure; to protection from unlawful *in rem* forfeiture of property; and to protection of his right to privacy. He alleges that each of these civil rights has been intentionally violated by the defendants.

Incentive to follow rules

The first question is whether Hollingsworth, Fishel and Wypijewski took the actions described in the complaint. The second question is, if they took those actions, whether the court will find that the actions violated the law and Kay's civil rights. Unless and until those questions are resolved, the defendants

deserve the benefit of the doubt.

Another question, though, is why does this matter come up now?

Other FCC bureaus, such as the Mass Media Bureau and the Common Carrier Bureau, routinely deal with well-capitalized licensees and license applicants, including TV broadcasters and regional Bell operating companies. Actions taken by officials in those bureaus regularly affect enormous sums of money. It is "worth it" to companies regulated by those bureaus to devote the resources necessary to make sure that FCC officials who handle their applications and petitions follow the letter of the law—and to challenge the commission whenever they find mistakes. Over the years, this attention has given these bureaus' employees an incentive to follow federal law and the commission's own regulations.

The Private Radio Bureau regulates large numbers of individuals and small businesses with limited resources. When it comes to opposing an illegal bureau action that causes them harm, it may be less expensive to accept the damage than to pursue relief.

During the past five years, the value of exclusive private radio licenses (such as most SMR licenses and certain private carrier licenses) has escalated. Previously, it might not have paid to spend from \$5,000 to \$25,000 to defend rights to channels worth about the same amount; now some of those channels are worth \$300,000 or more.

Some people believe that certain Private Radio Bureau officials think their jobs go beyond enforcing the law; rather, these officials think their personal decisions *are* the law. True enough, the FCC makes the rules. But once it does, all of its employees must follow the rules just as the licensees they regulate must. In addition, they are obliged to follow the applicable federal law.

Whether or not Kay prevails, his complaint may inaugurate a new level of attention to due process of law at the Private Radio Bureau and at its planned successor, the Wireless Telecommunications Bureau.

—Don Bishop

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December

6-8—Wireless Datacomm Fall, Washington Convention Center, Washington, DC. Contact: 800-322-9332.

1995

January

16-18—Mobile Communications Conference, sponsored by Frost & Sullivan, Westin Hotel, Galleria Dallas, Dallas. Contact: 800-256-1076.

February

1-3—Cellular Telecommunications Industry Association Winter Meeting and Exposition, New Orleans. Contact: 202-785-0081.

March

13-14—AMTEX, the American Mobile Telecommunications Association's Marketing and Technology Conference and Exposition, The Buttes, Tempe, AZ. Contact: 202-331-7773.

16-17—Government Land Mobile Communications Conference, sponsored by TMSA Conferences, Rosslyn Westpark Hotel, Arlington, VA. Contact: Steven Silver, 310-534-4871.

20-23—Supercomm, sponsored by USTA and TIA, Anaheim Convention Center, Anaheim, CA. Contact: 202-326-7300.

April

3-5—Energy Telecommunications and Electrical Association, George R. Brown Convention Center, Houston. Contact: 214-235-0655.

25-27—International Wireless Communications Expo/Spring, Las Vegas Sands Convention Center, Las Vegas. Contact: 800-828-0420.

May

17-19—Mobile Communications Conference, sponsored by the National Association of Business and Educational Radio (NABER), Hotel del Coronado, San Diego. Contact: Nancy Palleschi, 800-759-0300.

31-June 2—Radiocomm, Toronto Metropolitan Convention Center, Toronto. Contact: 613-233-4888.

July

26-28—Vehicular Technology Conference, sponsored by IEEE Vehicular Technology Society, Hyatt Regency Chicago O'Hare, Chicago. Contact: Keith Paglusch, chairman, 312-399-2378.

31-Aug. 4—Utilities Telecommunications Council, Hyatt Regency and Convention Center, Minneapolis. Contact: 202-872-0030.

August

13-18—Association of Public-Safety Communications Officials—International National Conference, Detroit. Contact: 800-949-2726.

September

20-23—Personal Communications Showcase, sponsored by the Personal Communications Industry Association (PCIA), Orange County Convention Center, Orlando, FL. Contact: 800-326-8638.

October

18-20—International Wireless Communications Expo/Fall, Tampa Convention Center, Tampa, FL. Contact: 800-828-0420.

November

7-9—WirelessWorld Conference and Exposition, sponsored by Cellular Business magazine, Moscone Convention Center, San Francisco. Contact: Chris Lotesto, 800-458-0479.

8-12—Communications Marketing Conference, sponsored by the Communications Marketing Association, Albuquerque, NM. Contact: Bernie Brownson, 303-371-8182.

17—Radio Club of America, Communications Symposium, 86th Anniversary Dinner and Awards Presentation, New York Athletic Club, New York. Contact: Ron Formella, 201-652-6811.



Mobile Radio Technology™

The journal of mobile communications technology

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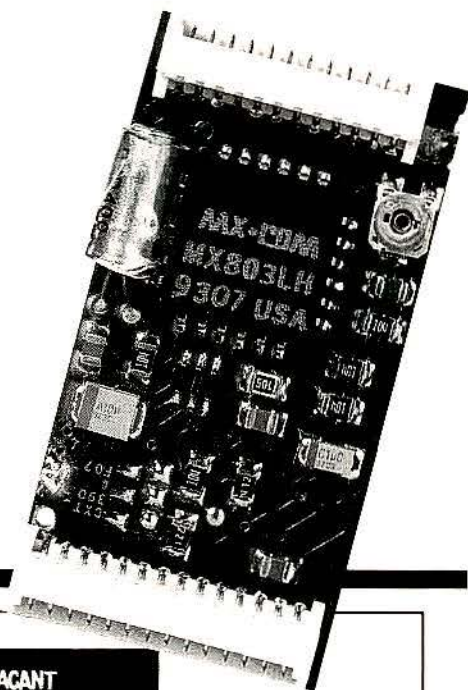
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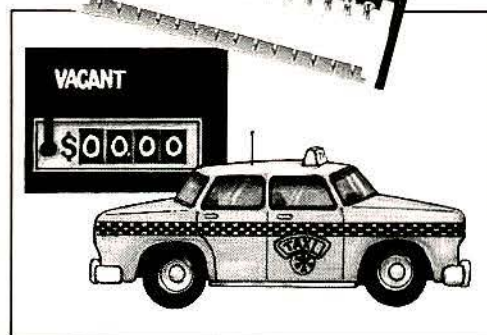
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1995 Buyers' Guide

MRT's annual directory provides you with pertinent information you will want to retain for quick reference year-round. Products, services and brand names are listed.

MRT editorial staff

Welcome to the 8th annual directory issue of *Mobile Radio Technology*. We believe you will find it a complete product and services source for the mobile radio industry.

Industry authorities and our editorial advisory board helped us to establish informative categories and to compile data. We mailed questionnaires to suppliers and service companies, and we asked them to list the products and services they offer. This "Buyers' Guide" is designed to be an easily used reference for an entire year. It is divided into four sections: the **Product Directory**, the **Services Directory**, **Company Addresses** and the **Brand Name Directory**.

The **Product Directory** lists more than 90 categories of equipment and suppliers. Under each heading is a complete list of the companies that have that particular product available.

Under the product headings, you will find companies that are **advertisers in this issue listed in blue**. Additional information about that company can be obtained by circling the matching

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Fast Fact number from its advertisement on the Fast Fact Card bound into the back of this issue and mailing it to us. (See page 145).

The **Services Directory** follows the **Product Directory** and lists 12 categories of services and the companies that provide them. Here again, you will find **blue listings for advertisers** in this issue.

Following the product and services directories, you will find an alphabetized index of **Company Addresses**, as well as phone numbers, for all companies listed

in this "Buyers' Guide." More than 900 companies are listed. Regional sales contacts are also listed for some of the advertisers in this issue.

The **Brand Names Directory** is an alphabetized list of brand names in the mobile radio industry and the manufacturers associated with these products.

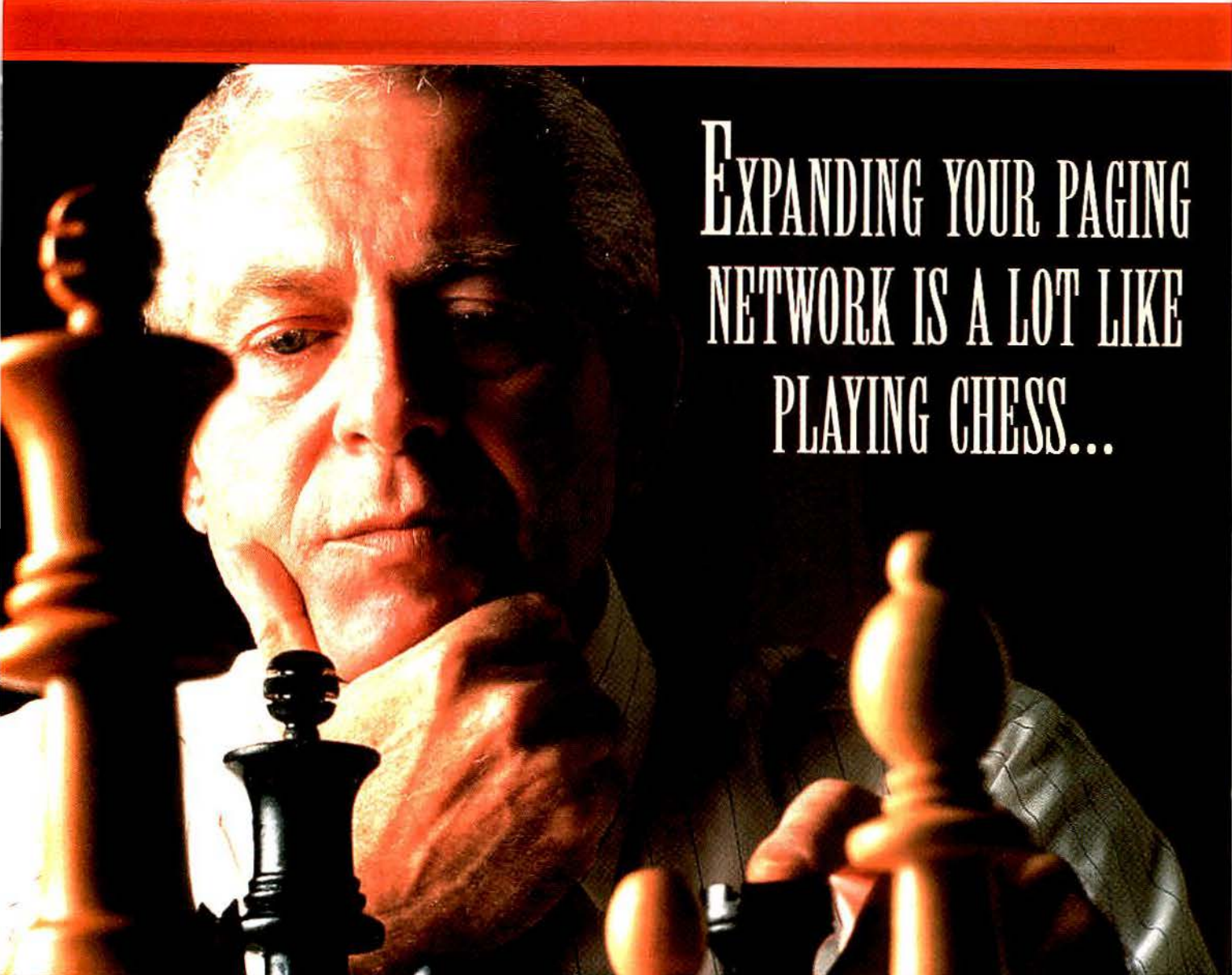
For your convenience, two **Fast Fact Cards** are bound into this issue. Each card is valid for a full year. Circle the appropriate numbers shown at the bottom of manufacturers' and service companies' advertisements and mail the card to us. You will receive additional information directly from the product source or service provider.

The editorial staff has made every attempt to make this "Buyers' Guide" an accurate and comprehensive listing of suppliers and services companies in the mobile radio field. Because of the number of suppliers in the field and because new entrants are always surfacing in this industry,

products or services may have been overlooked. If you represent one of these companies or organizations, please send your company's name and address to the address in the box at the left. This will help make the "Buyers' Guide" an even better reference next year.

To be listed in next year's "Buyers' Guide," send your company name and address to:

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Directory Editor
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FAST FACT CARD

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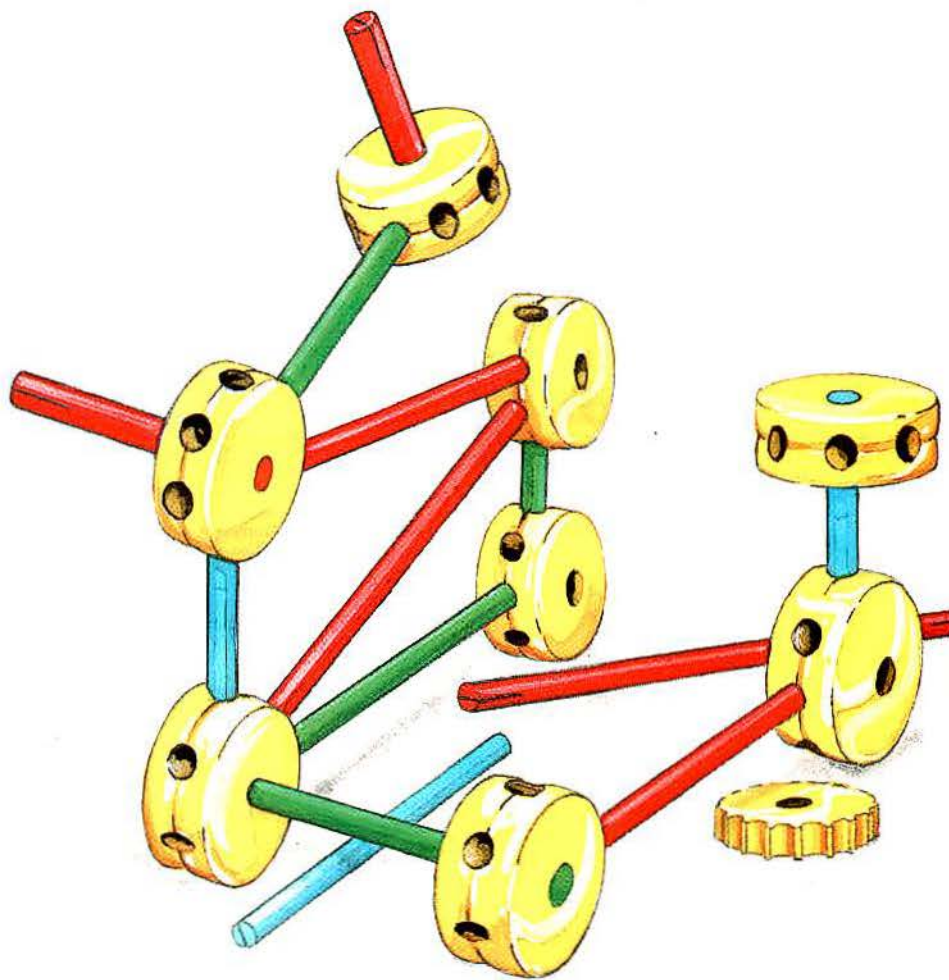
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Ferrite Hybrid Combiner
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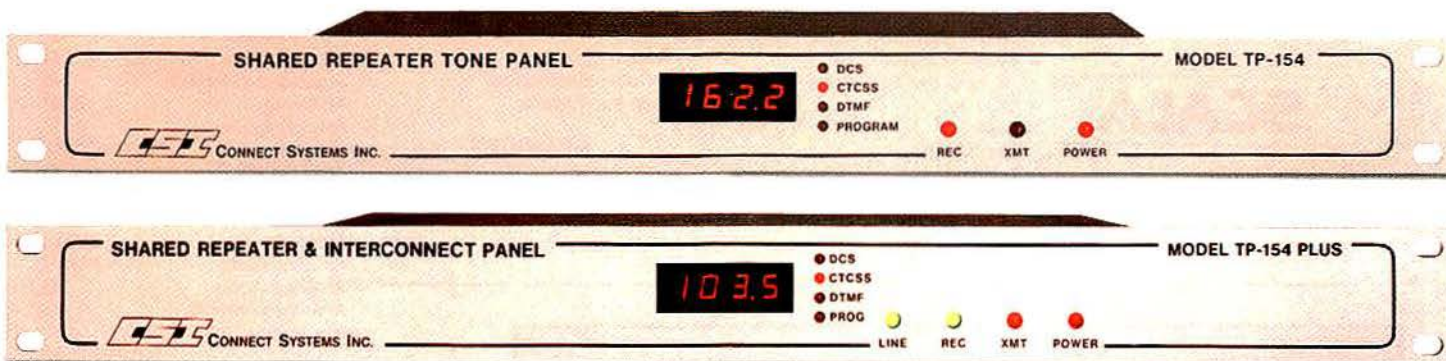
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Alpha Industries
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Many customers asked us to add Interconnect to the **TP-154**. We have responded and now offer the **TP-154 PLUS!** There are many new innovations such as mobile commandable temporary cross tone. Below we've listed some of the more important standard features of this exciting new Repeater/Interconnect Panel...

Repeater operation:

- 50 CTCSS tones
- 104 DCS codes
- Up to 154 repeater subscribers
- DTMF commandable temporary cross tone allows communicating with other CTCSS/DCS groups
- Mobile to mobile signalling
- Local, over the air and dial up programming
- Programming transpond to CD-1 Remote Data Display
- Data download to CD-1 Remote Data Display
- Front panel display
- CW ID per subscriber
- System CW ID
- Auxiliary Relay
- Repeater Time accumulation and Hits per tone/code

And much more!

Interconnect operation:

- Up to 154 Interconnect subscribers
- Interconnect time accumulation per subscriber
- Ringout and/or Overdialing
- Land to mobile selective calling
- Two tone, 5/6 Tone, DTMF, CTCSS, DCS signalling
- Six unique ringing alerts allow selective calling within a CTCSS/DCS group
- Full or Half Duplex operation per subscriber
- DTMF commandable Half Duplex Privacy
- 1-7 digit Interconnect access code per subscriber
- Regenerated DTMF or Pulse dialout
- Busy signal and Dialtone disconnect
- Toll restricts (1, 0, 976, 9 etc.)
- Toll overrides (Allows dialing to specific exchanges within restricted area codes)

And much more!



Optional **EX-8 Line Expanders** bring private subscriber lines into the **TP-154 PLUS** and allow DID style operation for up to 64 subscribers. (No overdialing required). Subscribers are billed directly by the TELCO thus eliminating message accounting headaches for the system operator. Supplied rack or wall mountable.

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Antennas

B Base, G General,
M Mobile, P Portable
AAT Communications BMP

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Adams Distributing BGMP
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Advanced Fox Antennas G
Advanced Videotech G
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Cellular Wholesalers GMP
Celwave BMGP 15



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Codan BMG
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DP Electronics BG
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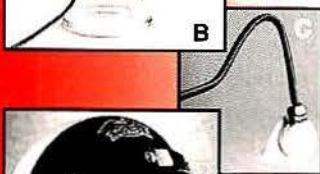
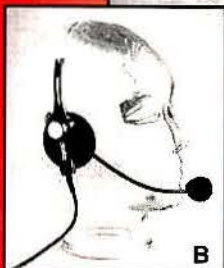
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BASIC CELLULAR B BAND	48543-N	880-894
ENHANCED CELLULAR B BAND	48551-N	880-894

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Illumicell G
Jan Communications BGMP
& Electronics GP
JB Communications BGMP
Jefa International BGMP
E F Johnson BGMP 78-79
Kenwood USA GP 37
Kintronic Labs G
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Mobile Radio
Mitsubishi International MP
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Mobile Mark BGMP 34
Modublox & Company G
Monicor Electronics BGMP
Morcom International BGMP
Motorola BGMP 5, 24, 32, 52
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Olympic Paging Comm/Crescent
Communications BGMP
ORA Electronics GMP
Page Com BGMP
Paragon Engineering GP
PMC Associates BGMP
Portable Depot P
Primus Electronics G
Procomm USA BGMP
Pulstar Distributing BGMP
Comsat RSI, Mark Antennas G 82
Radio Communications BGMP
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Secom Systems G
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Talley Communications BGMP 94
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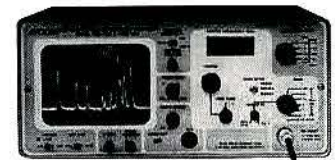
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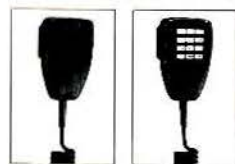
The 592T is part of Shure's patented ModuLink System 1. Modular cordsets allow the 592T to plug instantly into virtually all popular radio transceivers with no hard-wiring, making installation and cable replacement literally a snap.



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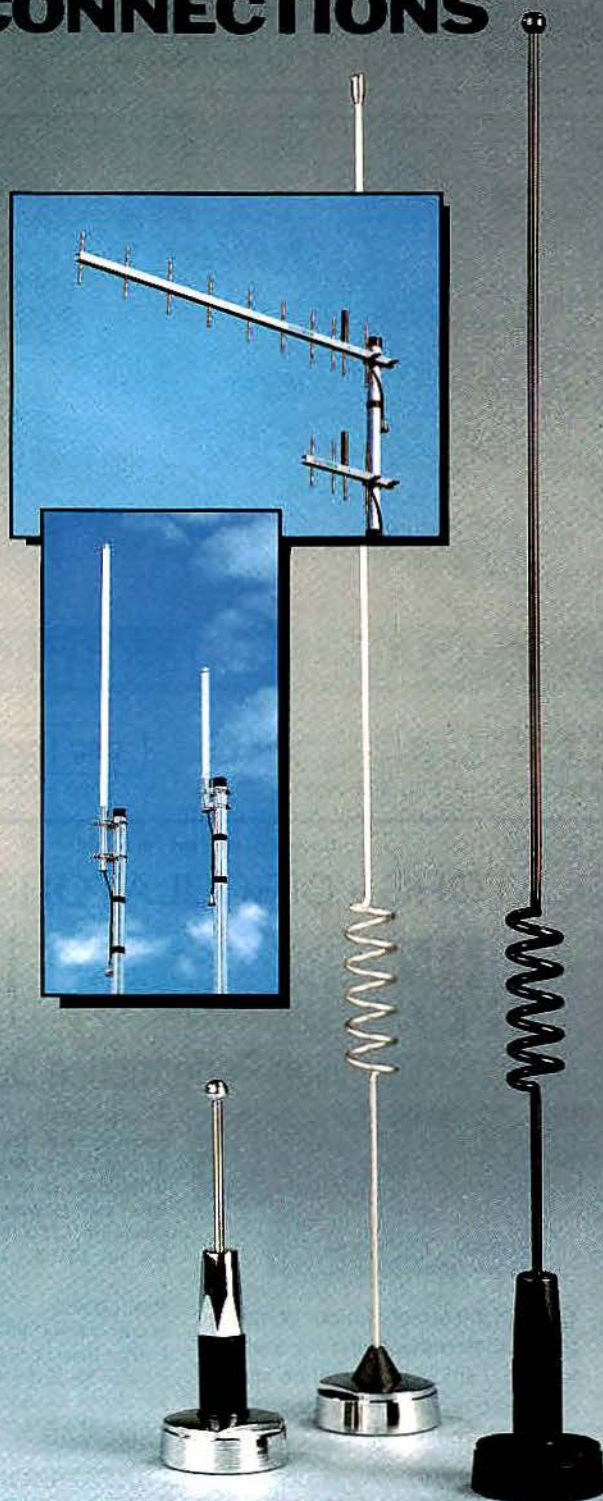
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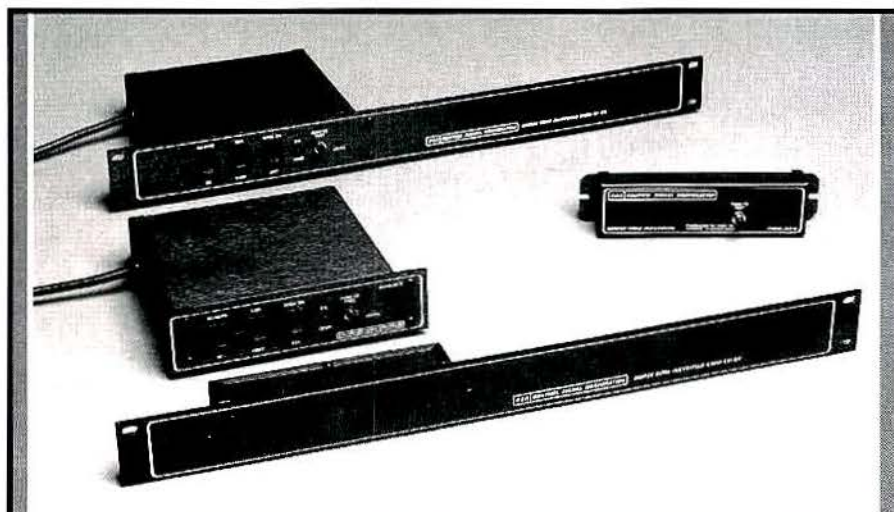
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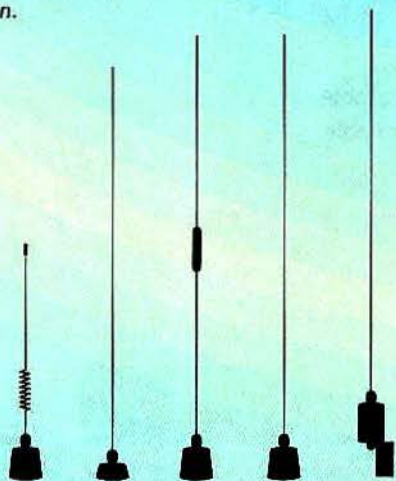
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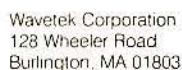
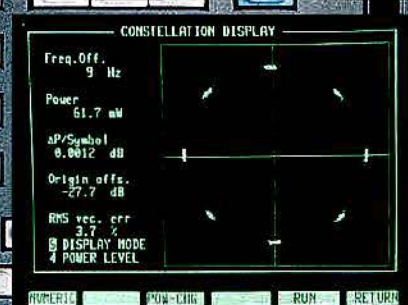
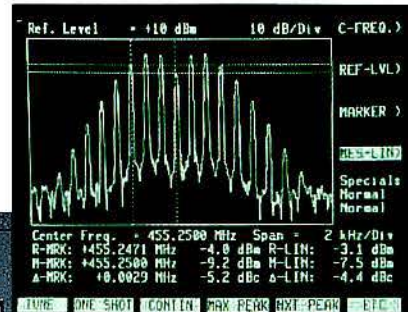
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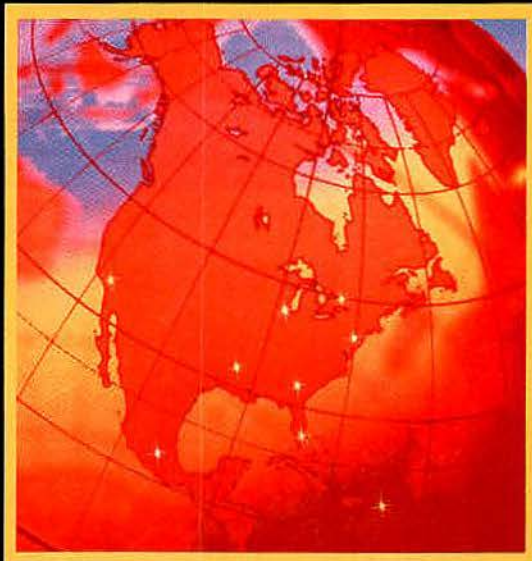
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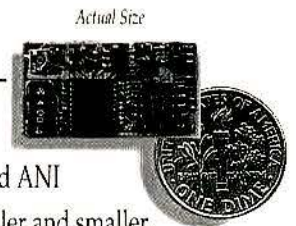
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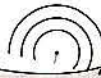
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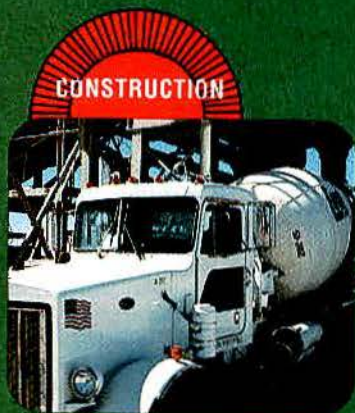
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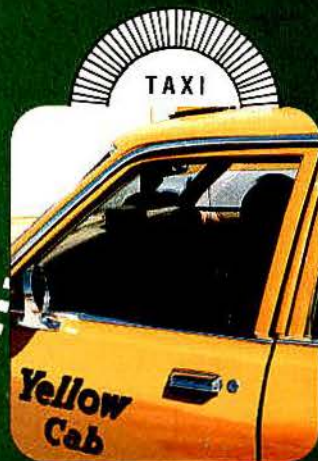
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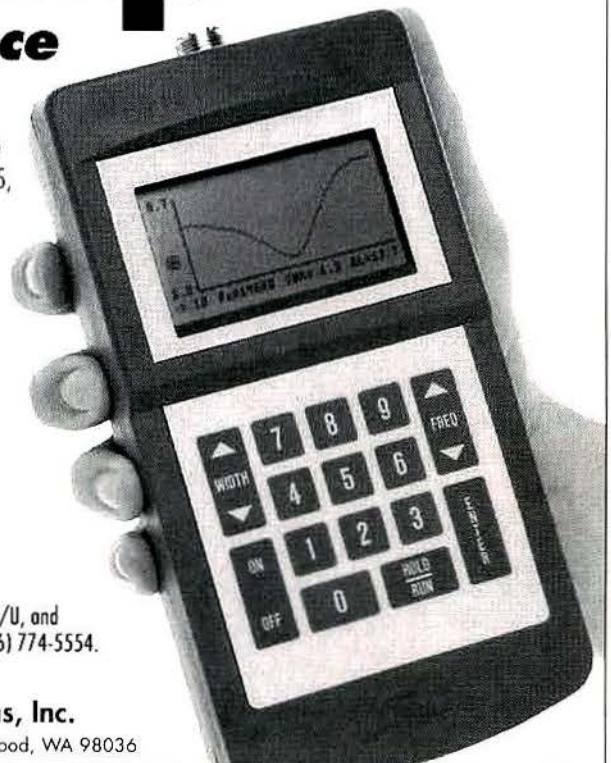
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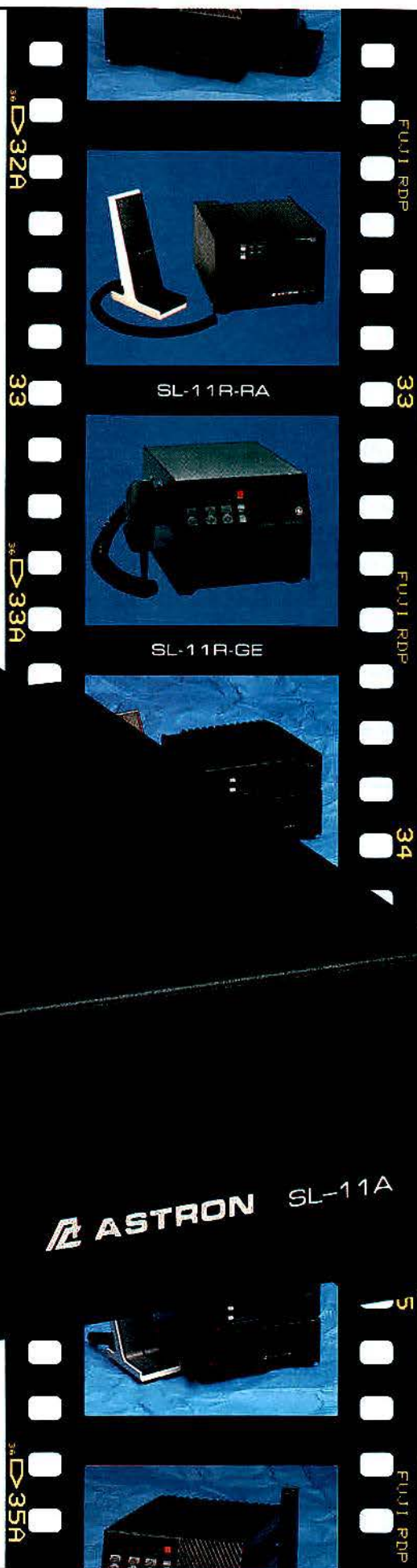
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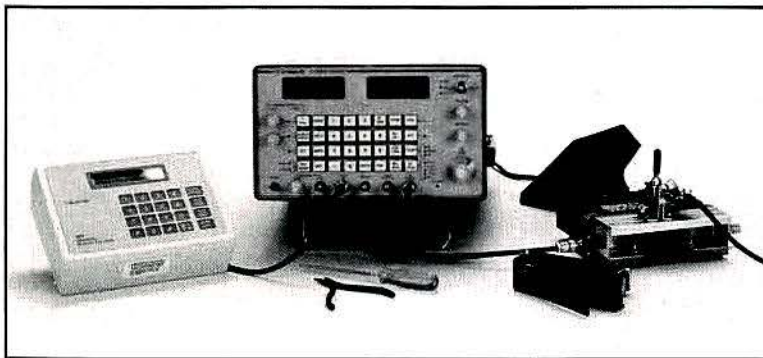
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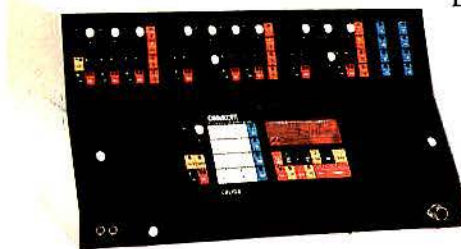


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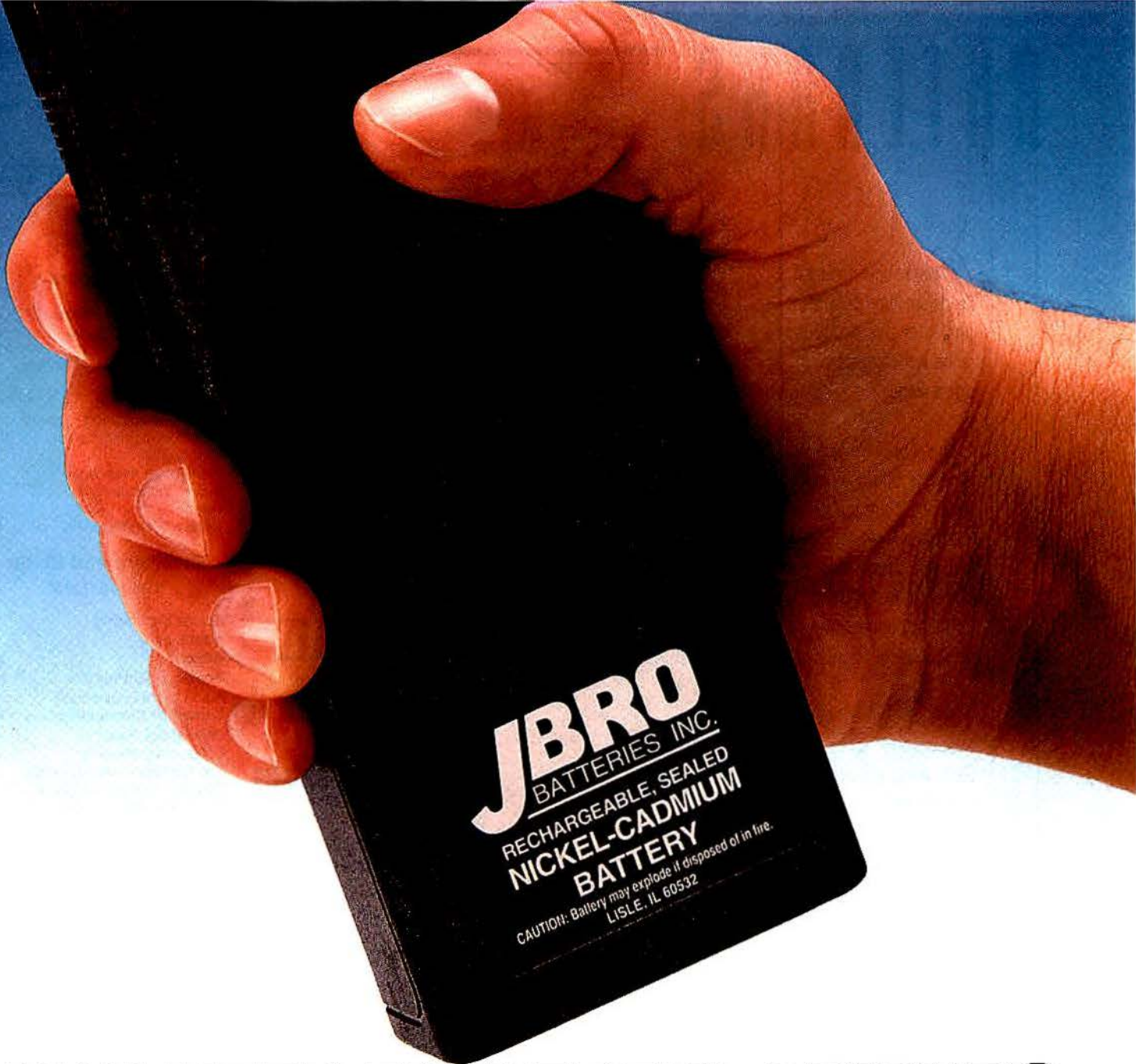
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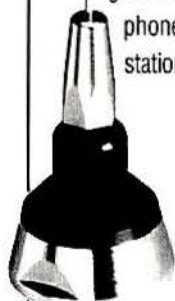
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**Message Repeaters -
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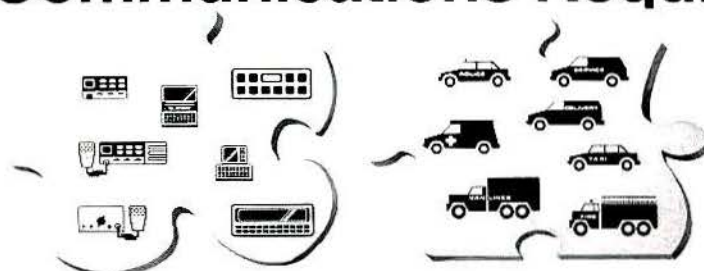
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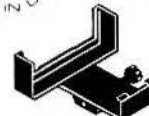
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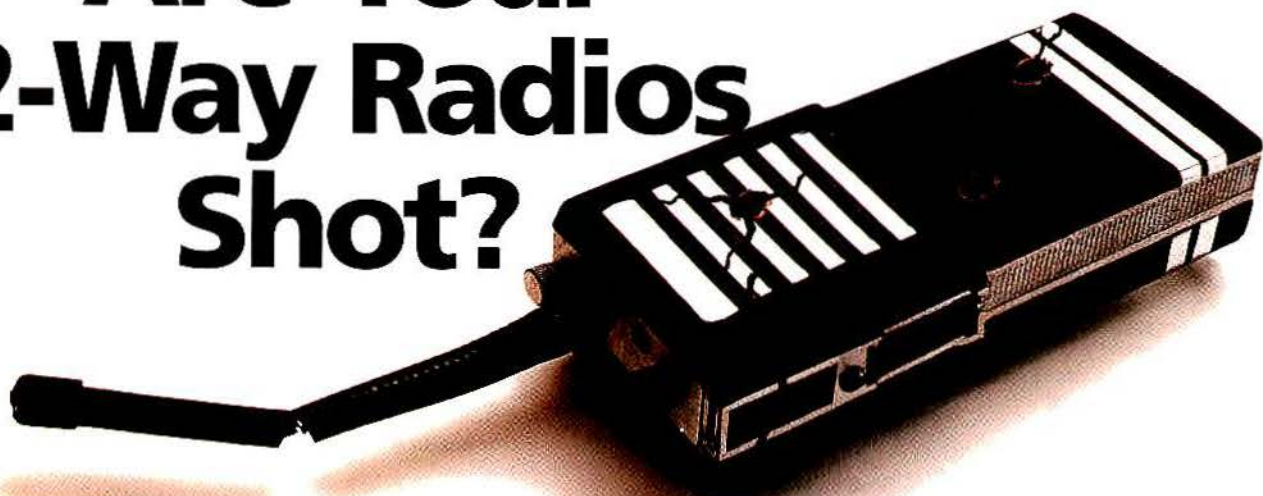
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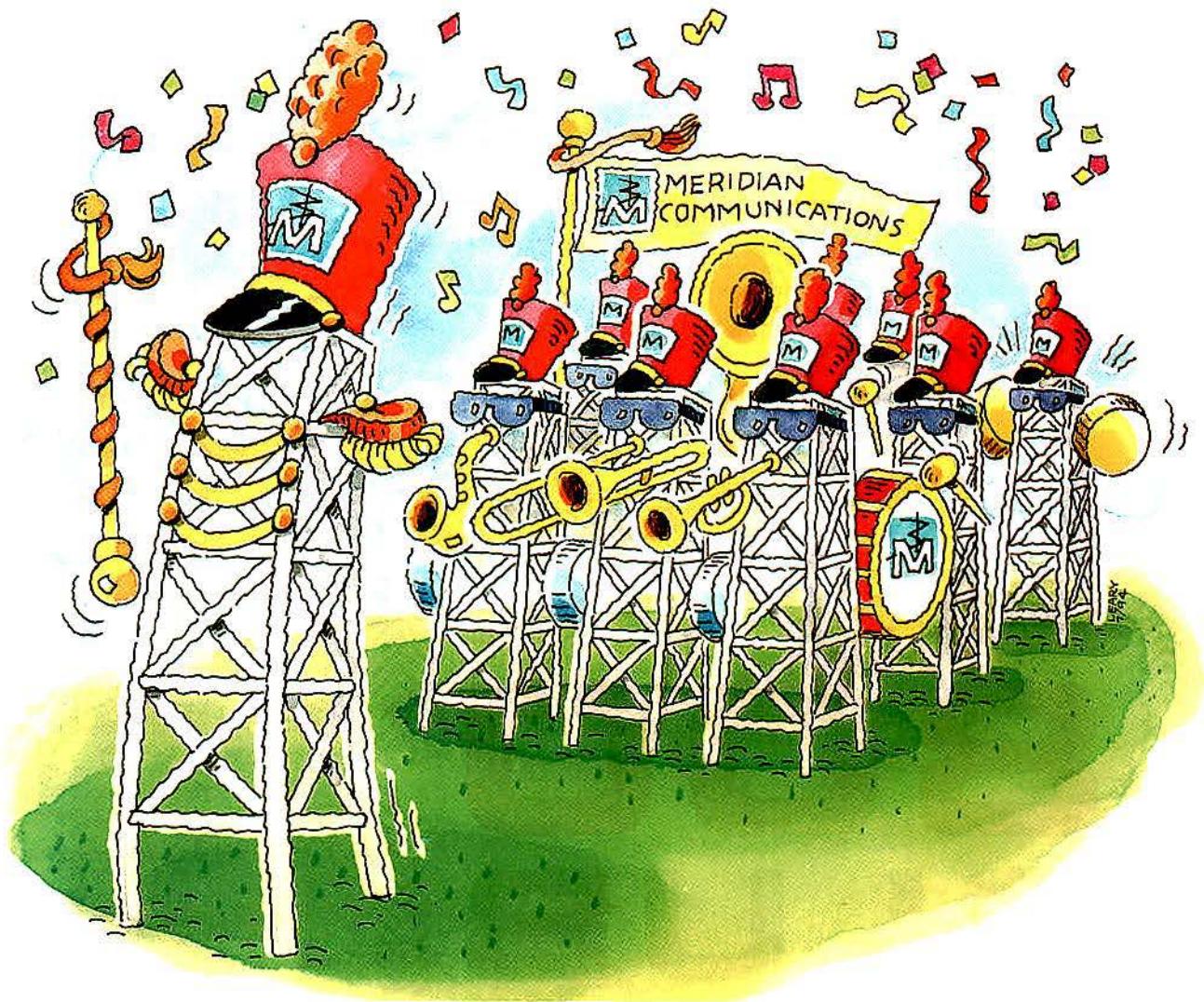
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 PRC
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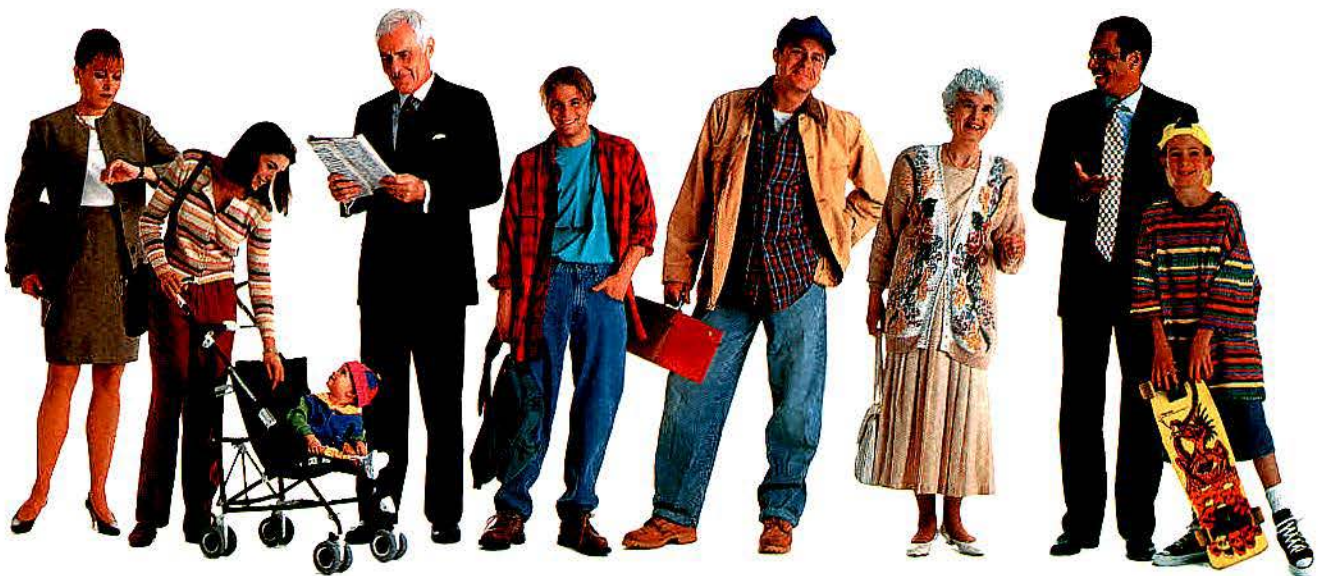
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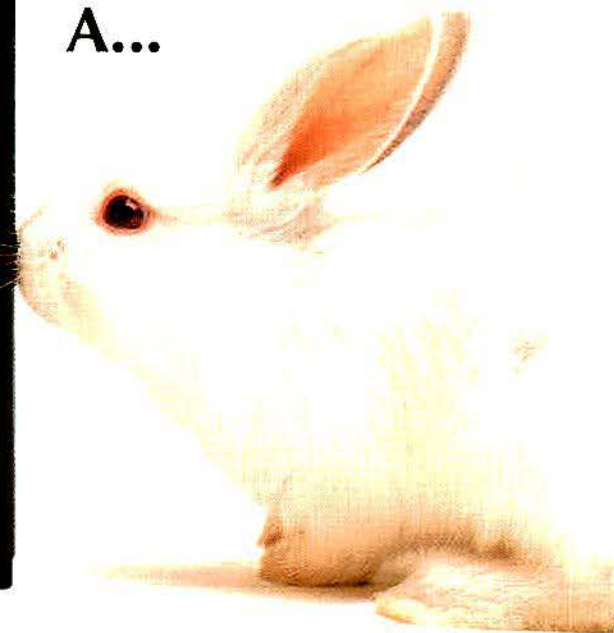


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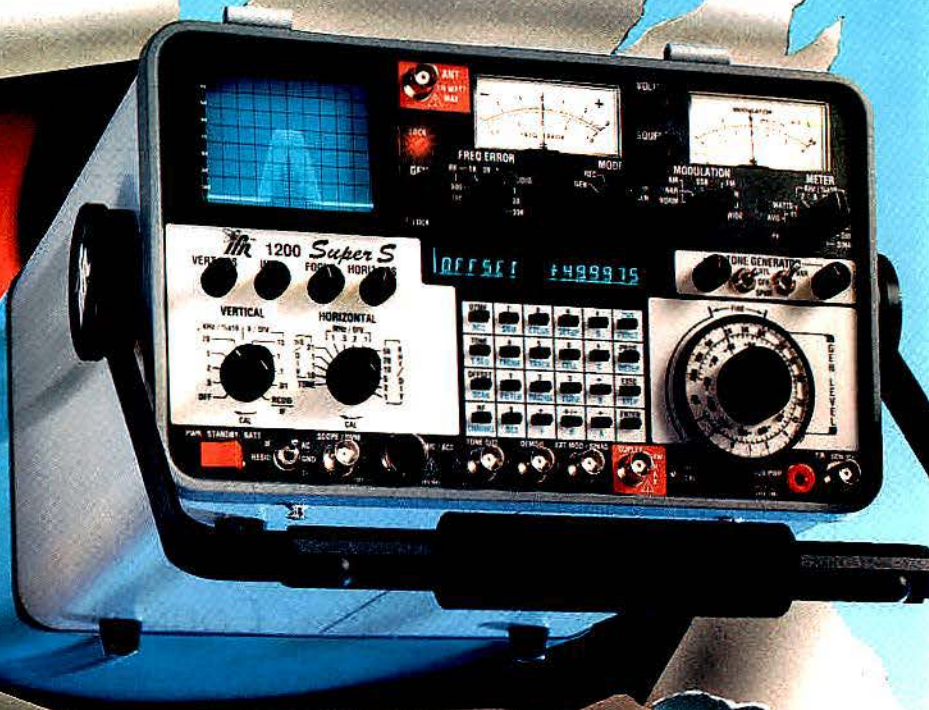
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Sonar Radio

S&W Associates

System Perfect

Tekk

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Multiplier Industries

Newmar

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Power Conversion Products

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Pulstar Distributing

QM Enterprises

R/M Wholesale Communications

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Wholesalers

Radio Wholesale Marketing

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Samlex America

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Tessco

Transworld

Tripp Lite

VDO-PAK

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Les Wallen USA

Webster Communications

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Wisco International

C W Wolfe Communications

Zirco

**Preselectors -
See Antenna Site
Equipment**

Programmers, NAM, PROM and Others

BYTEK

Cellular Wholesalers

Cetacea Sound

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ETrunk Systems

ExCellular Communications

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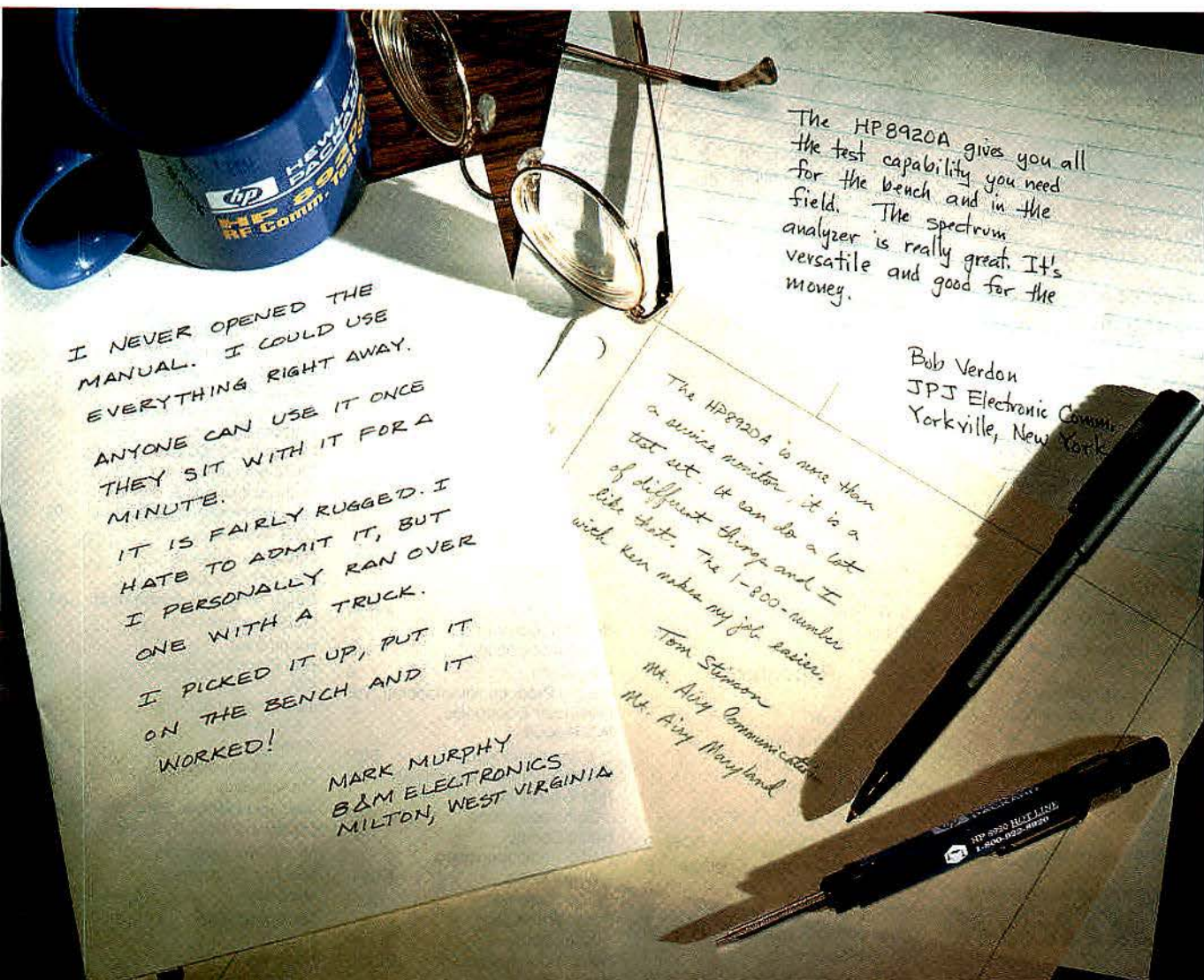
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 Tekno Industries
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 PCI-Pekaar
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 Shinwa Communications MP
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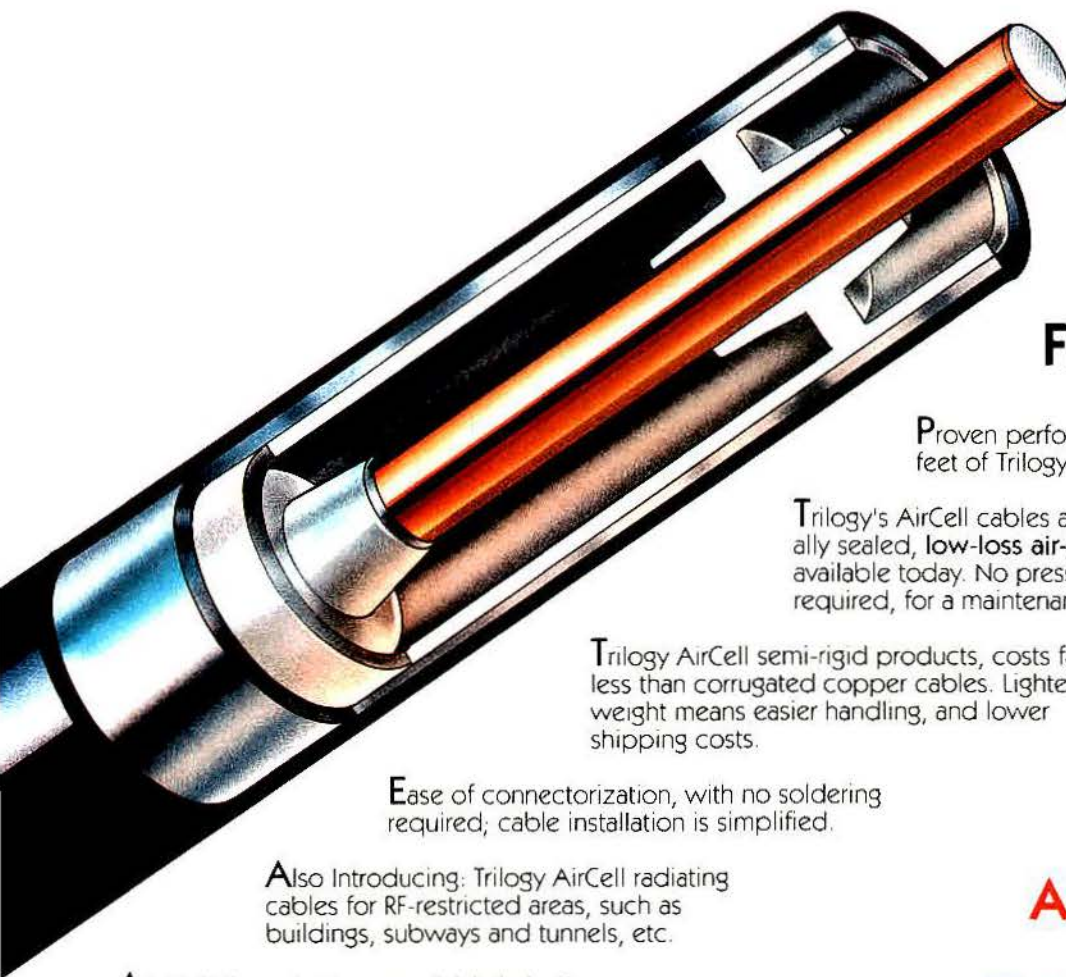
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 Canadian Marconi
 Carlson Communications
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Rural Radio Telephone Systems



Telepoint

Scanning Receivers (Scanners)

Ace Communications Monitor Div
Adams Distributing

Berkeley Varitronics
Cellular Wholesalers

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Norand
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Pulstar Distributing

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Safco
Santa Fe Distributing
Sunflower Radio Products
Synetcom Digital
Talley Communications 94
Uniden America 67
Wisco International

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Adams Distributing
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Auto-Comm Engineering
B&C Communications
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Alltel Supply
American Towers & Structures
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Elite Building 16

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FWT
Goldspar Communications
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Hill Radio Communications
Hite Electronic Sales
Hulse Enterprises
Illumicell
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Rohn
Ruf'Nek Building
Sabre Communications
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Tower Structures
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Mobile International
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Spectrum Communications 84
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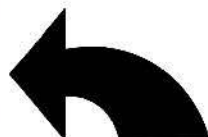
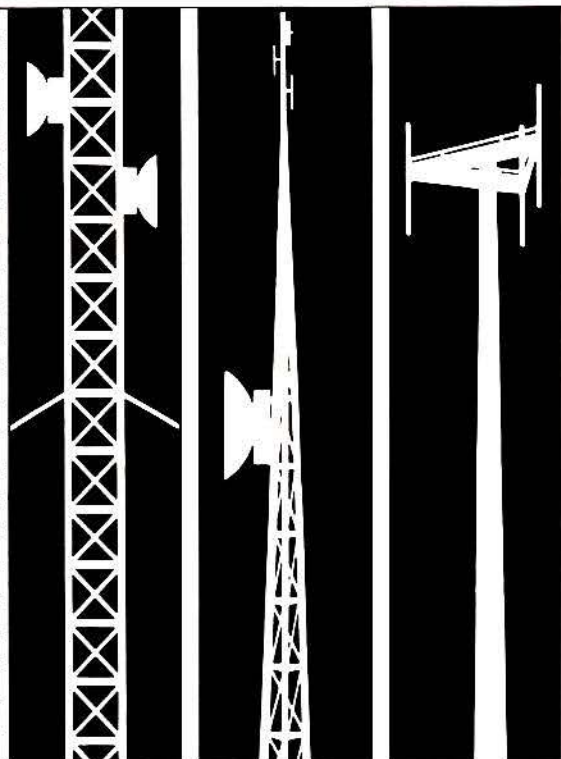


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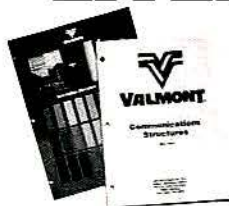
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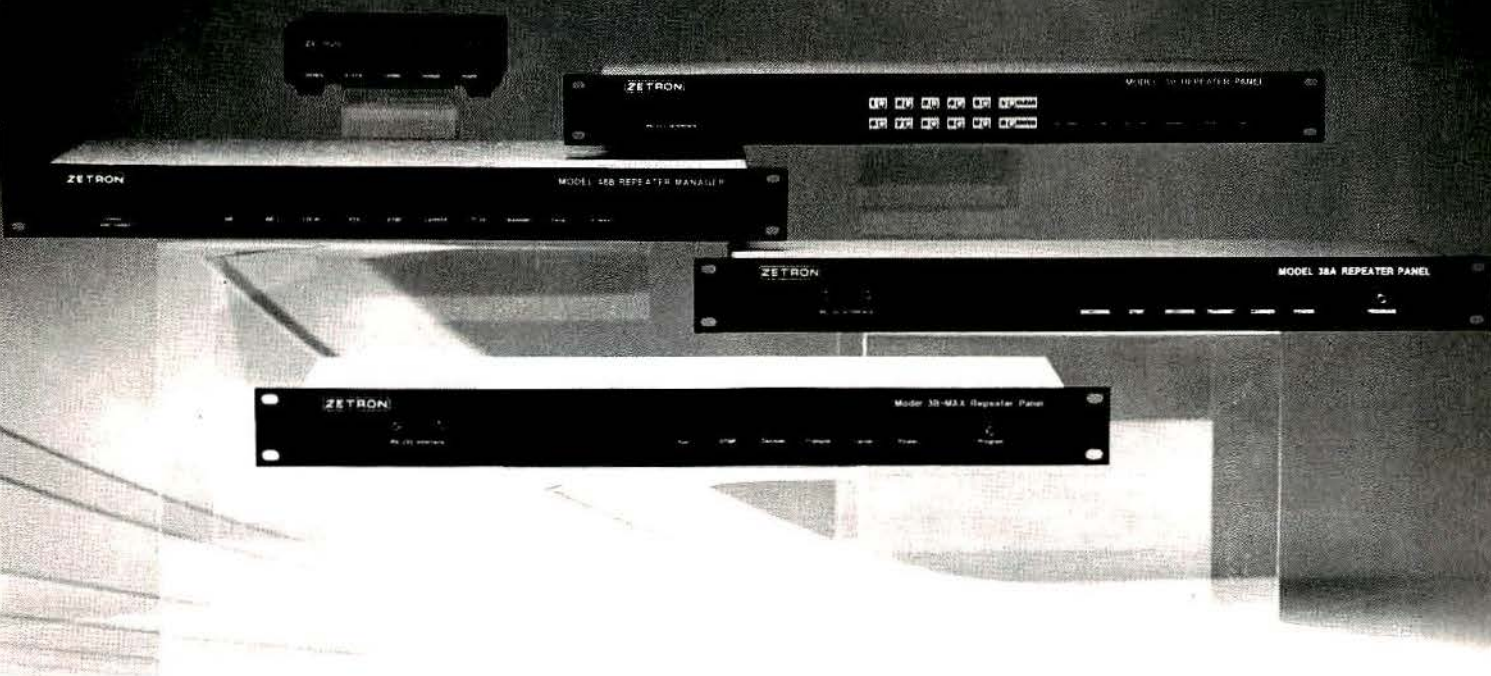
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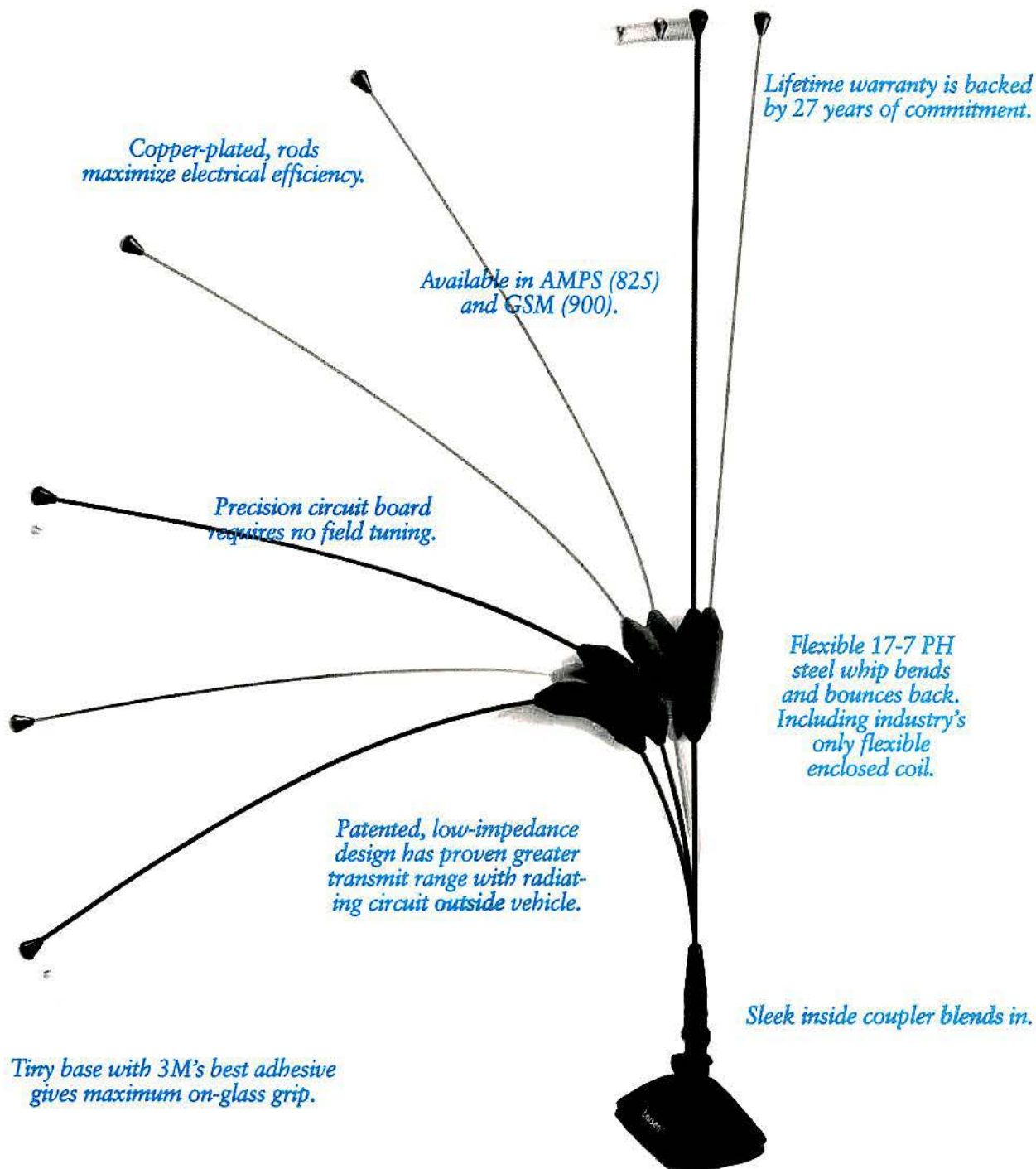
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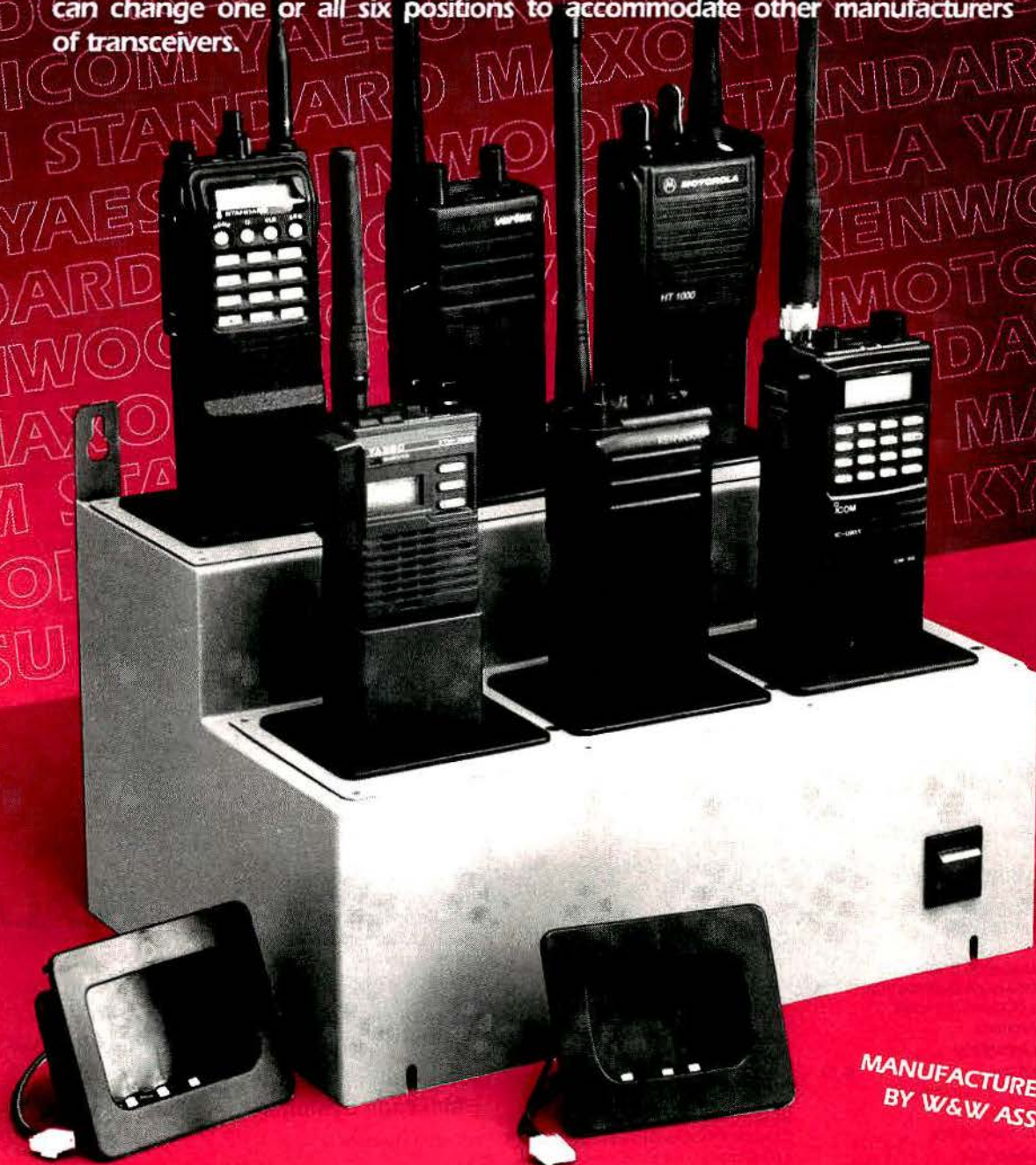
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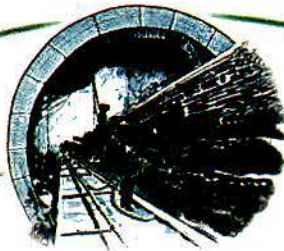


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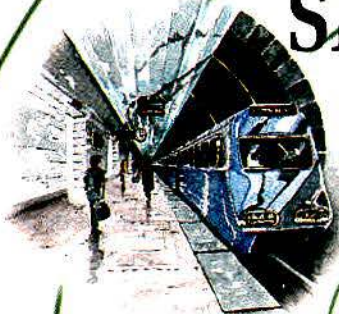
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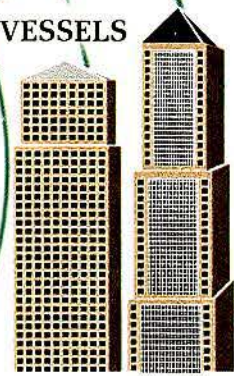
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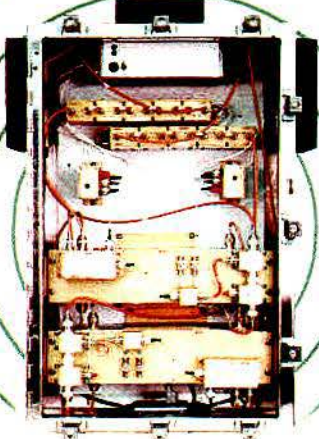
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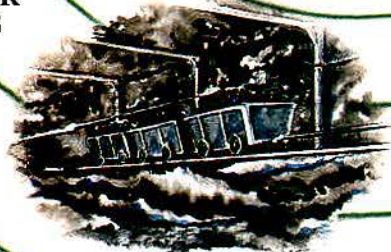
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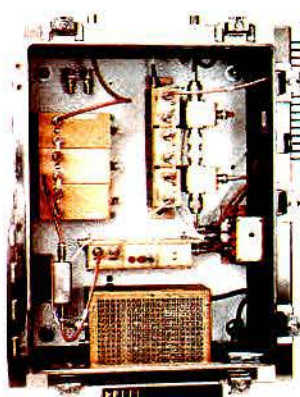
Model No. 61-89A-03-OLC-G2
800 MHz two-way repeater amplifier
(With output level control and high selectivity
8-section combine filters)



MINES



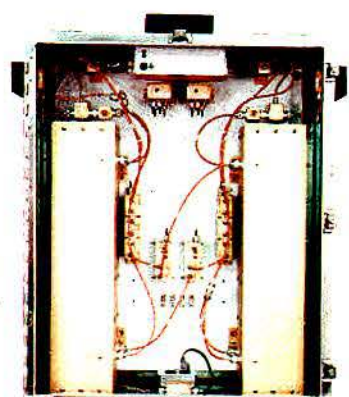
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Since its deployment in 1980, our first system has provided uninterrupted radio service deep inside a coal mine in the Midwest. Thousands of units are in use around the world, as a vital part of two-way radio, paging, radiotelephone, data transmission, telemetry and control systems operating on frequencies from 132 to 960 MHz. Applications include communication systems for major international airports, high-rise buildings, subway systems, copper and coal mines, aircraft carriers, nuclear reactor containment buildings, and the tunnel under the English Channel.



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Danmax Communication
Delcom Industries
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Lyncole XIT Grounding
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Olympic Paging Comm/Crescent Communications
Portacom
RTI Communications
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Sound Designers Studio
Unita Communications

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Antenex
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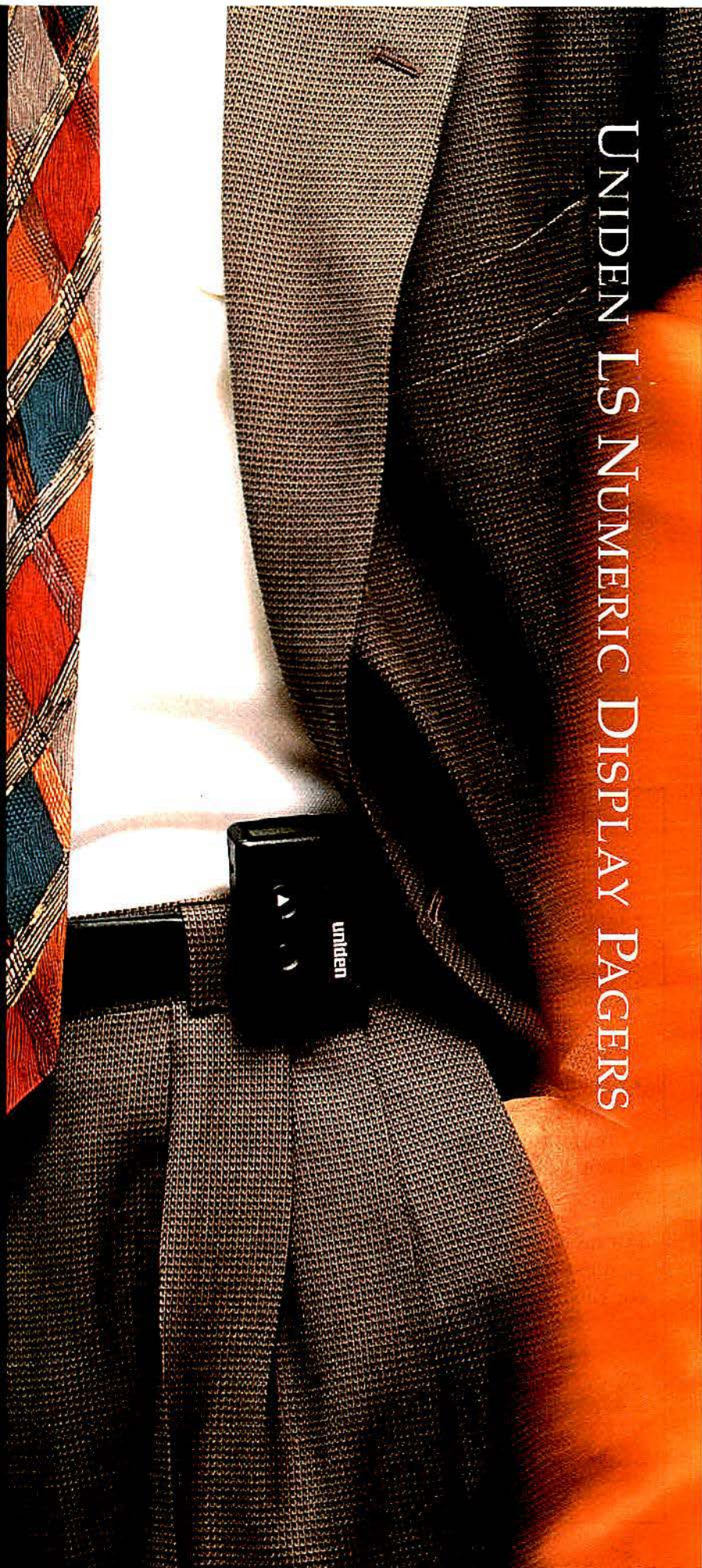
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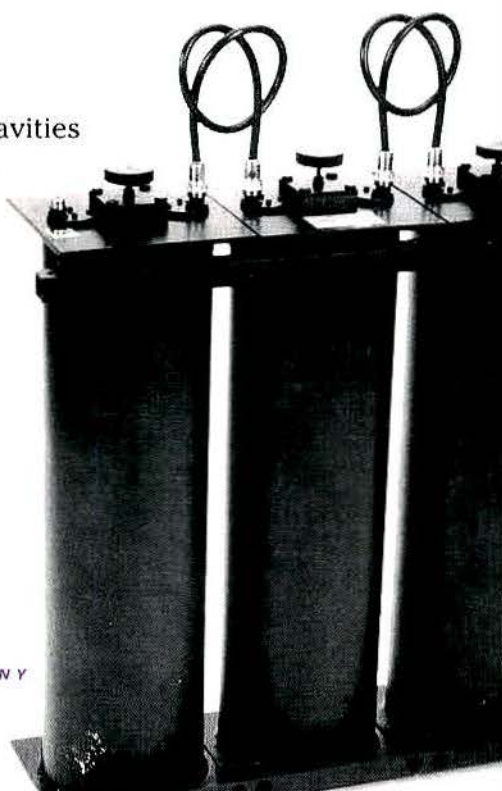
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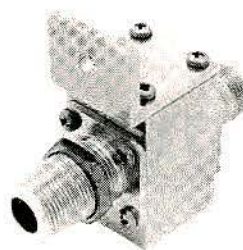
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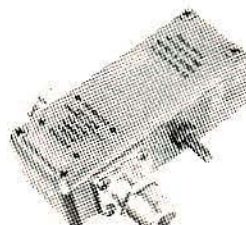
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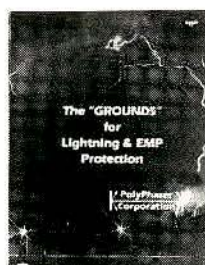
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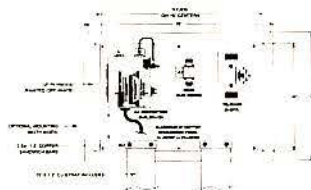
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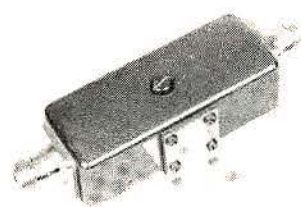
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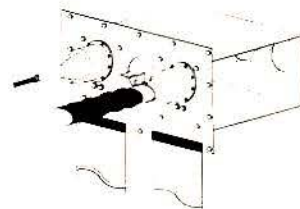
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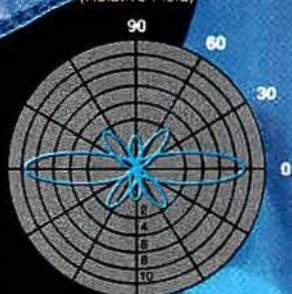
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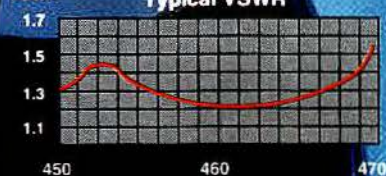
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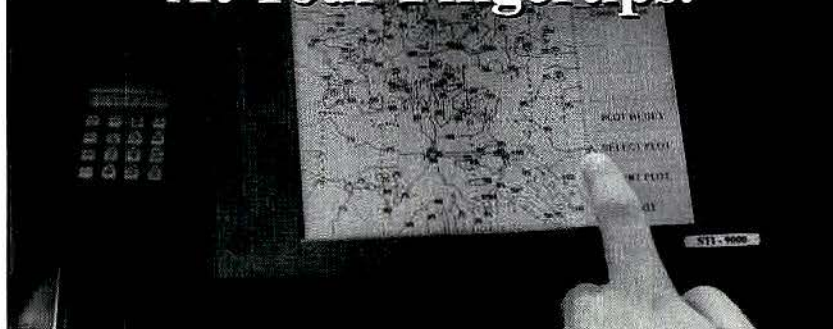
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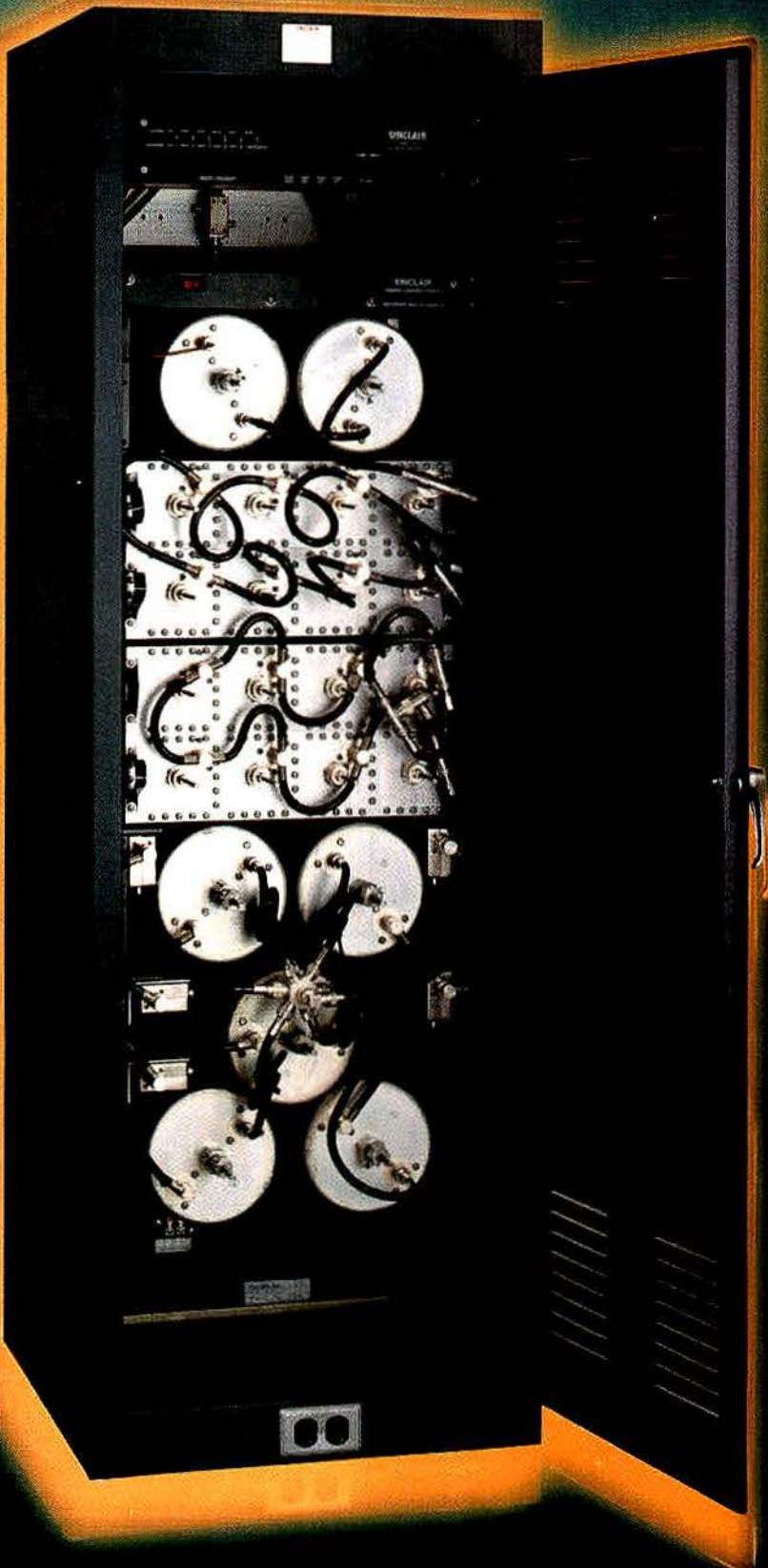
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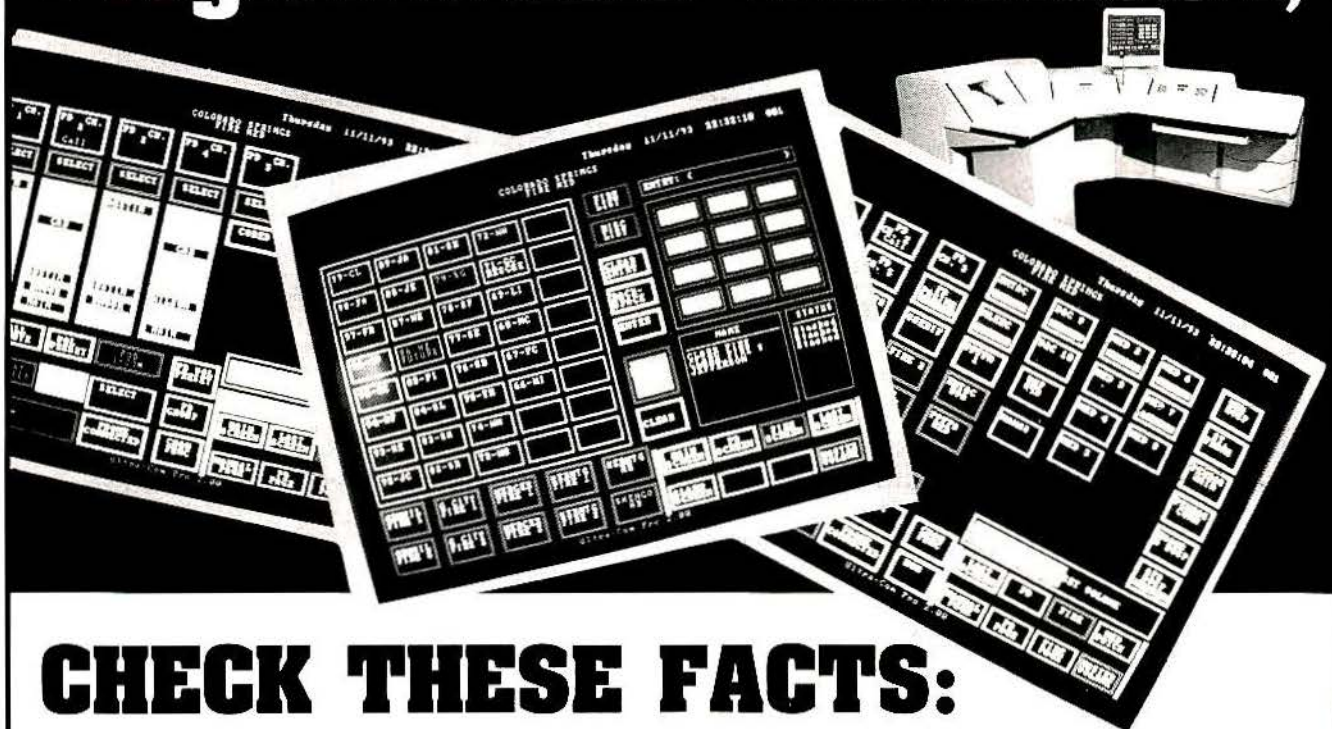
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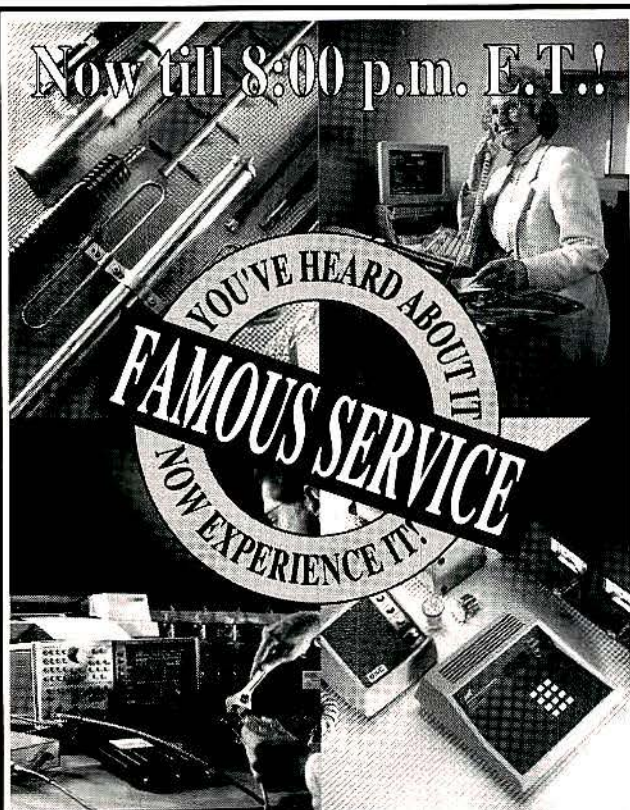
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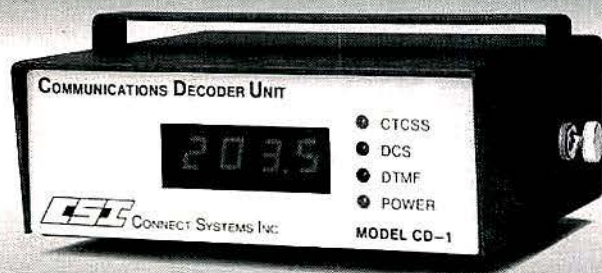
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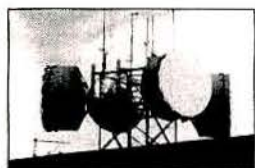
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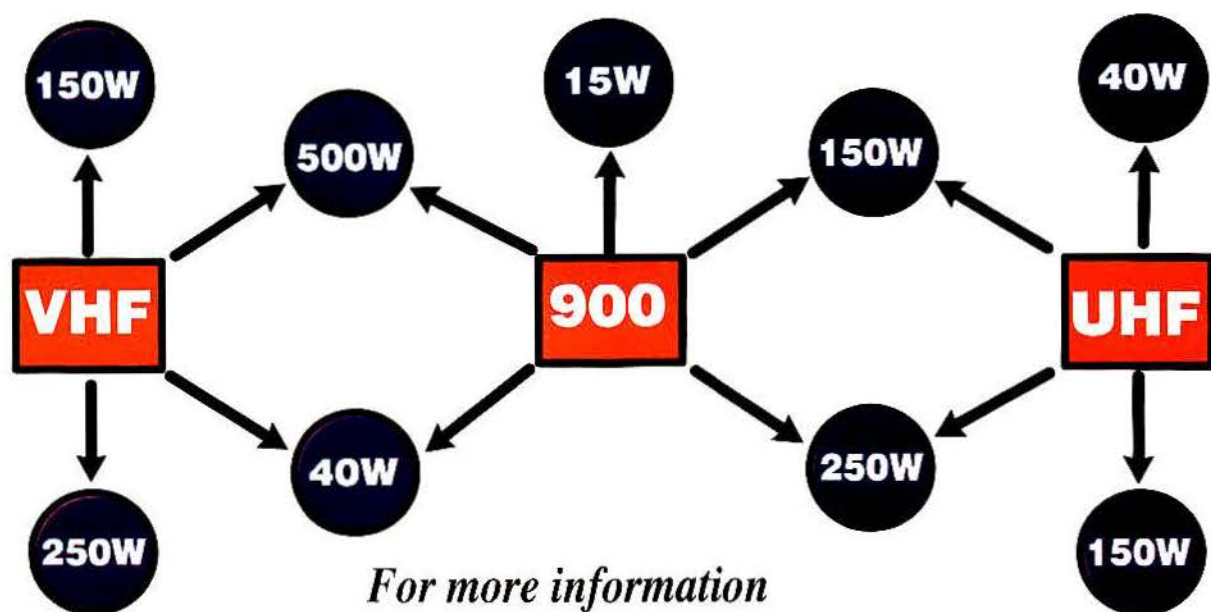
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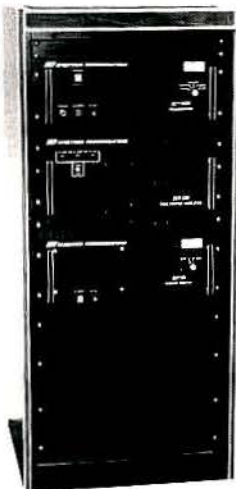
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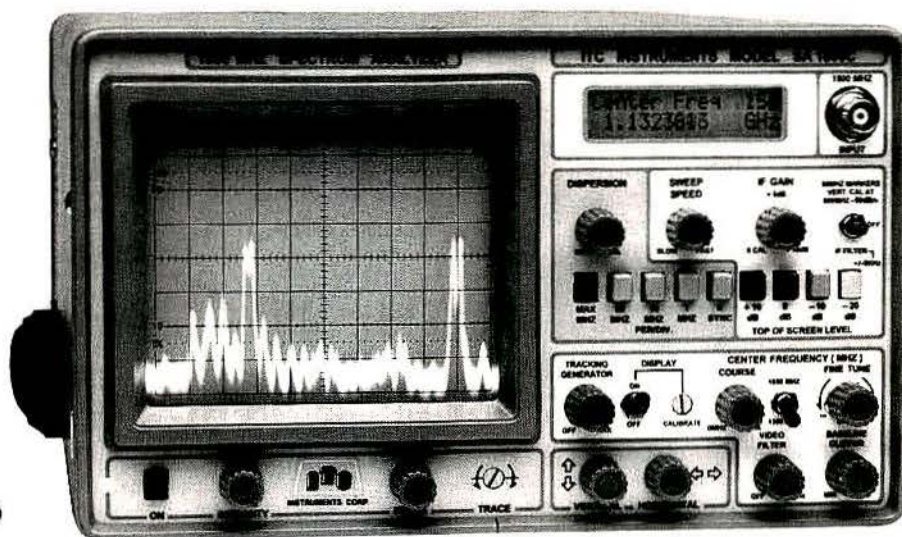


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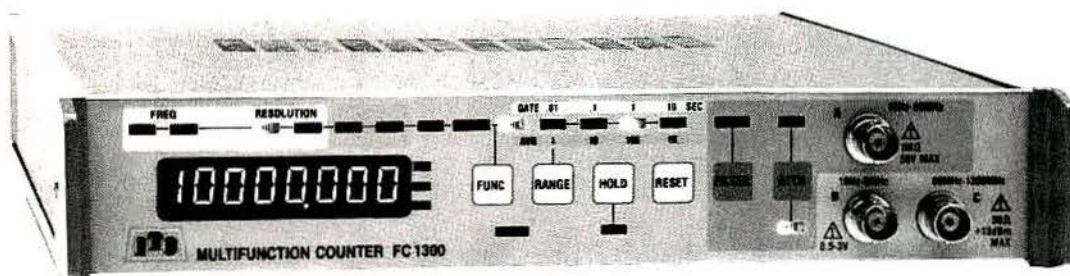
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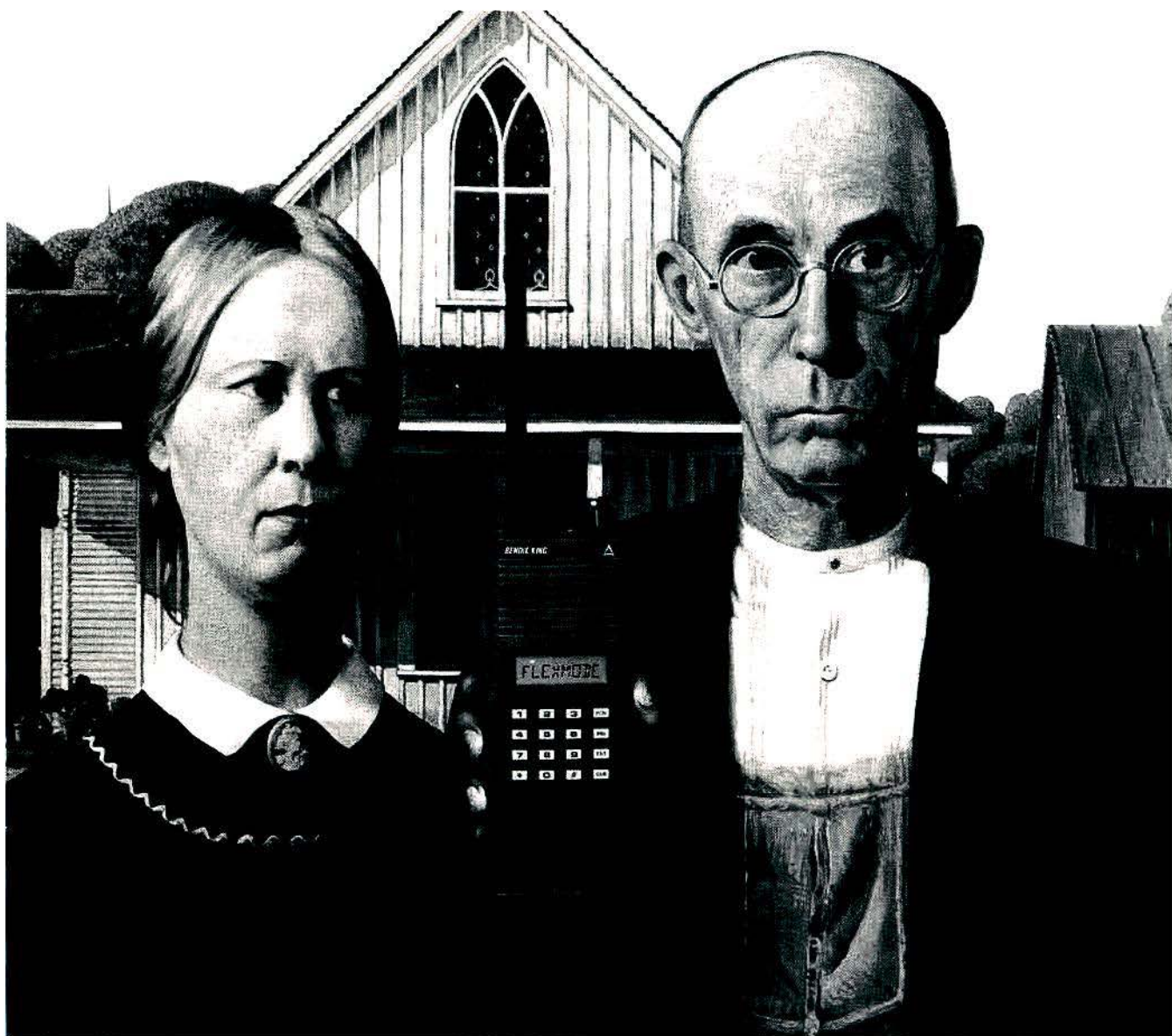
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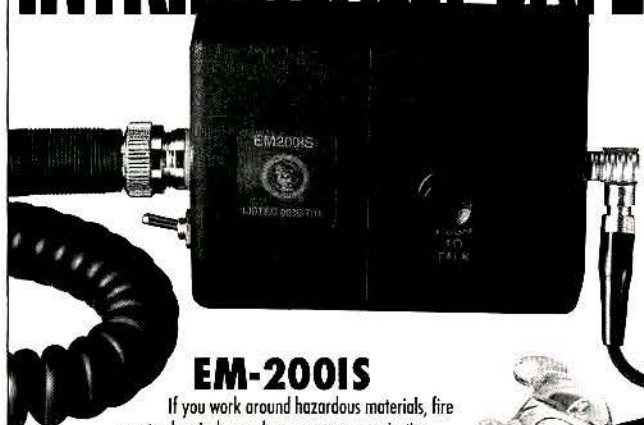
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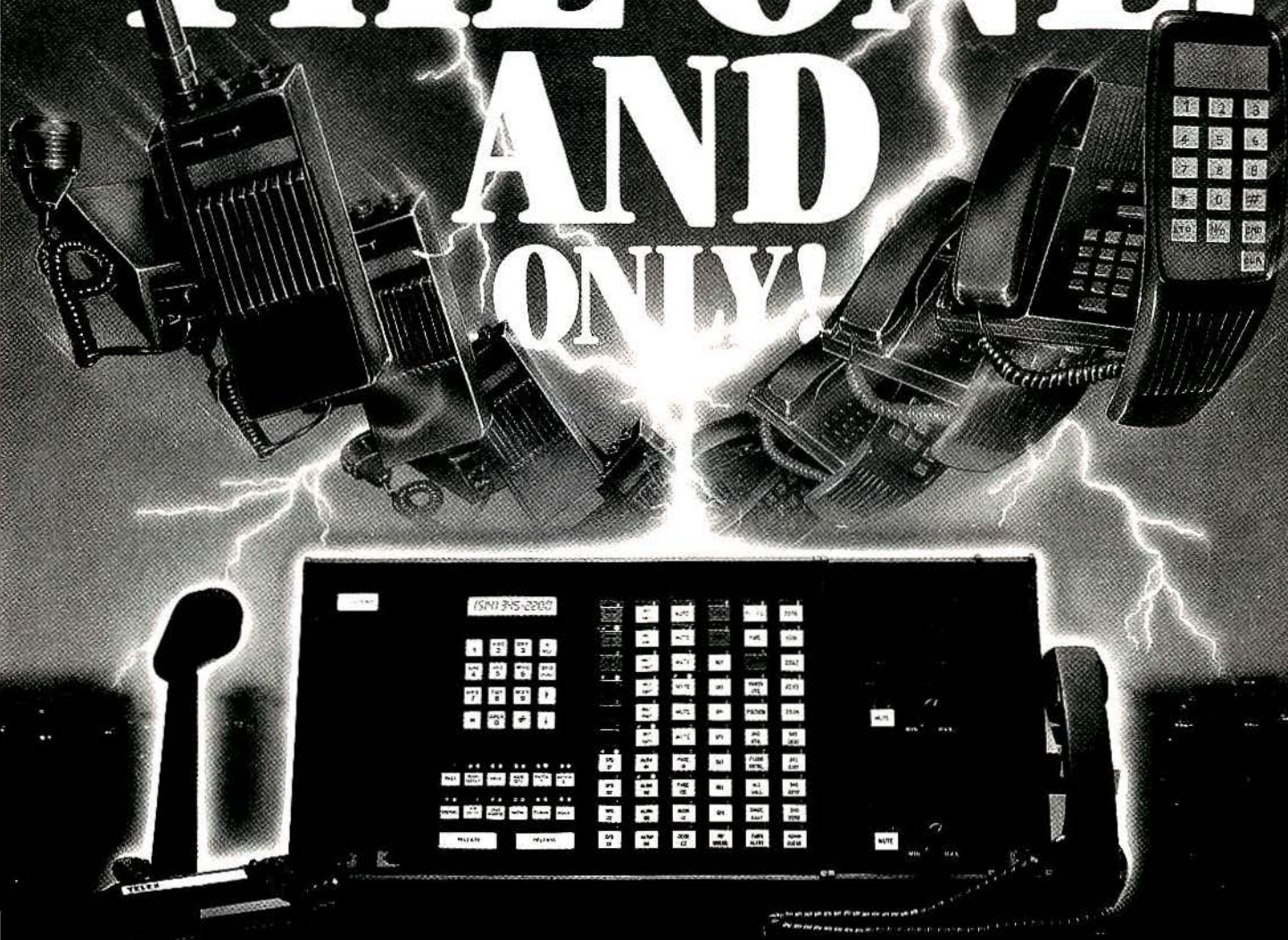
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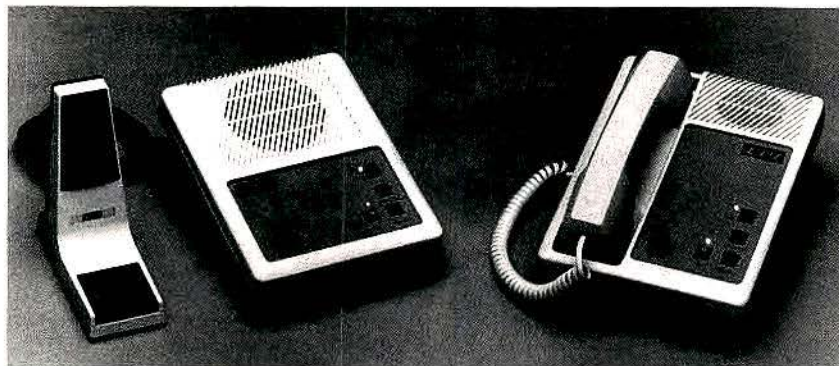
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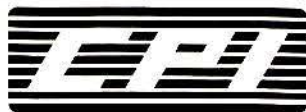
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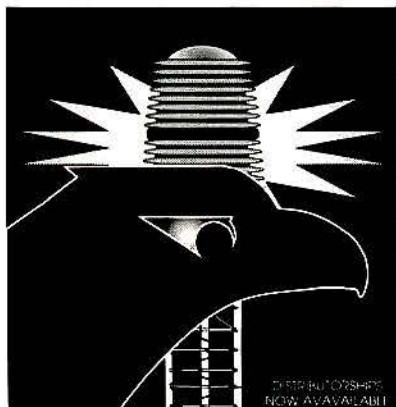
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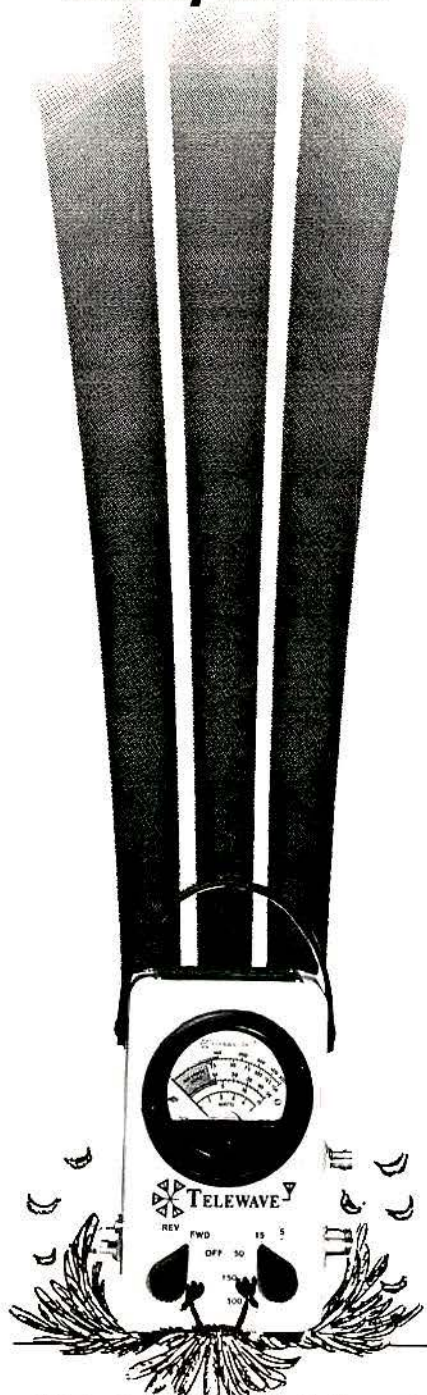


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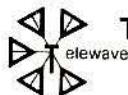
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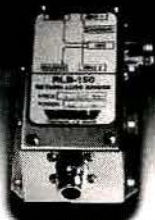
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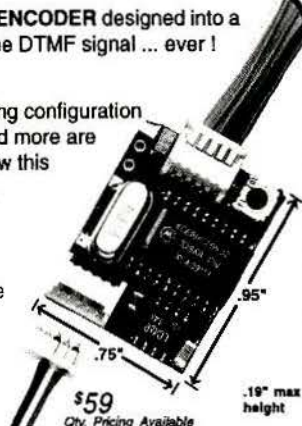
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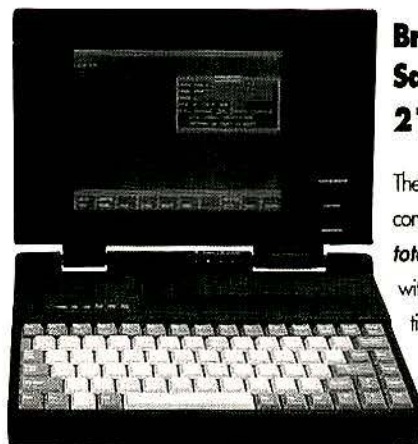
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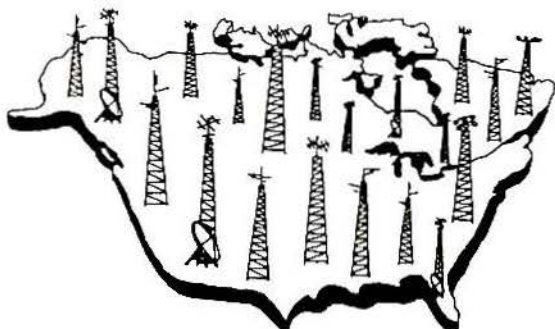
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 INTELLILINK — Real Time Strategies
 INTELLIPAGE — Real Time Strategies
 INTERCEPTOR — Statistical Control Systems
 INTERCEPTOR MACH — Statistical Control Systems

INTERMODPLUS — Douglas Integrated Software
 ISD — PageTap
 ISOBAR — Tripp Lite

J-L

JOB COM — Ritron
 JOHNSON — E F Johnson
 KIZZ — Berkeley Varitronics
 KULDUCKIE — Larsen Electronics
 KULGLASS — Larsen Electronics
 KULROD — Larsen Electronics
 L PAGE — Reach Electronics
 L PER — L-Tronics
 LANDTRUNK — Telemobile
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 LIBERTY — CML Technologies
 LINEMAN — Helper Instruments
 LINGO — Motorola
 LITTLE L PER — L-Tronics
 LMR — Times Microwave Systems
 LTR — E F Johnson
 LTROAMX — SmartLink
 LTX — SmartLink
 LYNX — Western Multiplex

M-O

M AIRTIME LOGGER — Trident Micro Systems

M-PA MOBILE RADIO — Ericsson GE Mobile Communications
 M-PD PORTABLE RADIO — Ericsson GE Mobile Communications
 M-RK MOBILE RADIO — Ericsson GE Mobile Communications
 M R R T — Telemobile
 MAGNACOM — Telex Communications
 MAGNAPHONE — Solar Electric Specialties
 MAGNAROP — Telex Communications
 MASTR III — Ericsson GE Mobile Communications
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 MDS MOBILE RADIO — Ericsson GE Mobile Communications
 MEGA SWITCH — Hark Systems
 MEGASTAR — Harris Farinon Div.
 METROVIEW — Ball
 MICRO Z — MCG Electronics
 MICROCELL — Peninsula Engineering
 MICROFILL — Allen Telecom Group
 MICROLITE — Allen Telecom Group
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OMNIPOWER — Tripp Lite
OMNIPOWER — JBro Batteries
ON GLASS — Allen Telecom Group
ORATOR — Phonetix
ORION MOBILE RADIO — Ericsson GE
Mobile Communications

P-R

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PAGENTRY — Real Time Strategies
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RP REMOTE PROGRAMMER — Trident
Micro Systems
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S

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SECOM — Samlex America
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 SURE COMM — Telephonics
 SURFER — SoftWright
 SURGE DIVERTER — MCG Electronics
 SURGE MASTER — MCG Electronics
 SURGE PURGE — Citel America
 SYSTEM — Telemobile

T

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 T FLEX — Times Microwave Systems
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 THUNDRA PRO — Atlas/Soundolier
 TNT LOGIC CONTROLLERS — Trident Micro Systems

TONER — Helper Instruments
 TPATH — EDX Engineering
 TRACPAC — O A R
 TRANSIENT ELIMINATOR — Lightning Master
 TRAVEL TENNA — RF Products
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 TRILOGUE INFINITY — Comverse Technology
 TRPROFILE — Communications Data Service
 TSAM — Combined Technologies
 TT — PageTap
 TUNIPOLE — LBA Technology

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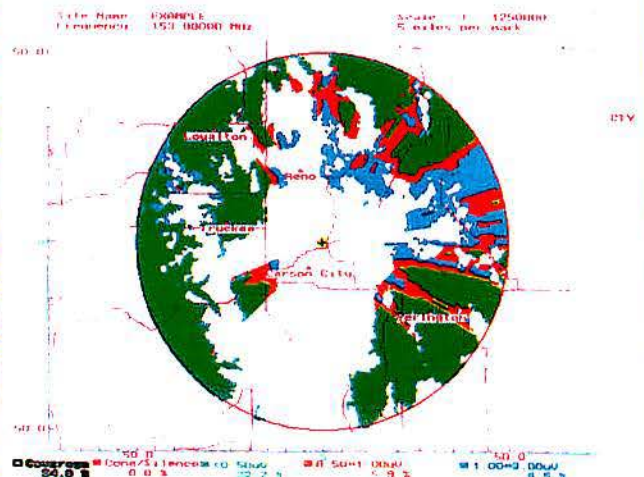
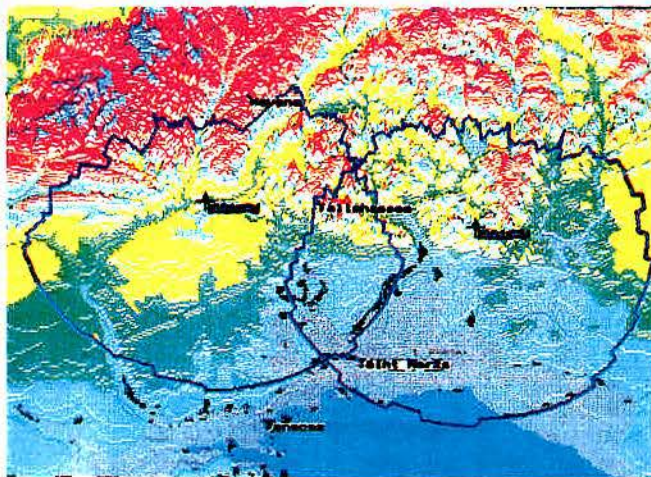
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Close may not count

By Robert H. Schwaninger Jr.

If you are into tempests, teapots and temerity, then you will be fascinated by the controversy about the "One-mile Rule" vs. the "One-second Rule" that has dominated the debate about the FCC's Finder's Preference program. If you have not even heard about the problem, Section 90.631(e) of the FCC Rules says, in essence, that if you discover an 800/900MHz-band facility that has not been constructed within one year of approval, and if the FCC has not discovered this fact before you, then you can file for a finder's preference.

Assuming that your claim that the facility has not been built is correct, the FCC will cancel the existing license, and you will receive a "preference" in the filing of an application to operate a system on the channels. That is, you are rewarded with a license for ratting on someone who has failed to construct and/or operate on the channels in question within one year of approval.

From a public-interest viewpoint, the Finder's Preference regulatory system

makes sense. The FCC has neither the time nor the resources to inspect every station to see whether it has been activated or whether the license is simply a ruse. So, if a person does everything necessary to gather the evidence of non-construction, presents that evidence to the FCC and thereby causes the channels to be available for use in providing services to the public, why shouldn't the FCC reward such a "junior G-man?"

The regulatory system worked fairly well at first. Spectrum that was lying fallow sprang to life with new licensees and radio communications systems. But, as with all good ideas, it only takes a while before aggressive folk start finding ways to overuse the FCC's good intentions—trying to leverage the system for financial gain. There is even a finder's preference mill, similar to application mills, that performs this task for speculators—sort of a "Finks R Us."



"...IT'S BEEN A TOUGH YEAR, ALL RIGHT. I MAY NOT EVEN BE ABLE TO CONSTRUCT MY SMR STATION!"

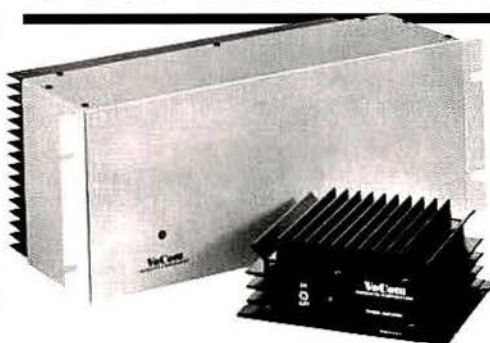
Schwaninger, MRT's regulatory consultant, is a partner in the law firm of Brown and Schwaninger, Washington, DC. He is a member of the Radio Club of America.

As people looked for new ways to use the regulatory system to their advantage, novel approaches arose. For example, one large enhanced specialized mobile radio (ESMR) operator stated that radio systems that had failed to get end-user licenses were not, in fact, providing legal service and, therefore, were not "operational" under the FCC Rules. That same large operator filed dozens of requests for finder's preferences to enhance its holdings in the Northeast, only to abandon its position when it was sold to an even larger ESMR—but not without grabbing a few channels along the way.

The law firm that represented the acquiring ESMR operator is now accusing another law firm of being anti-licensees for filing comments in support of a finder. It appears as though this issue is even causing stone-throwing in the large glass houses that make up Washington, DC, office buildings.

The newest approach for finders is to investigate whether the target station has been constructed in the wrong location. Because the FCC long has deemed construction at the wrong geographical coordinates to be tantamount to no construction at all, the logical argument nets a preference. One outfit has gone so far as to hire surveyors to see whether the geographical coordinates specified on the

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license accurately represent the radio system's physical location.

Meanwhile, the FCC is wrestling with this new method of claiming a finder's preference. In *The Matter of Fred B. Lott* the FCC decided that its old rule of accepting only one second (roughly 100 feet or less, depending on exact longitude and latitude) of difference between licensed geographical coordinates and the actual physical location would apply to finder's preferences. Then, a few months later, in *The Matter of Lawrence E. Vaughn*, the FCC decided that maybe a one-second rule was too strict and advocated that construction within one mile was sufficient.

Ignore for a moment that the FCC's rapid change of heart is more than a little unsettling to people who seek a bit more certainty from its actions. The question that hangs over the whole issue is: Should the FCC allow finders to get a license for channels that are fully constructed and serving the public from the wrong location, or should the FCC bend its rules and provide some "wiggle room" for licensees regarding the accuracy of their licensing data?

If you are a licensee of a radio system, you will probably vote for leniency regarding license data. That is, unless you are also trying to get someone else's license via a finder's preference. If you are a finder, you probably will want the FCC to be as tough as nails. If you are one of

and actual physical location is one about which reasonable people easily might differ. On the one hand, operators should take care to insure that their licenses accurately describe their systems' locations. On the other hand, it seems more than a little rough to demand that license coordinates be wholly accurate within a scant 60 feet.

The FCC, and particularly its Private Radio Bureau, has historically sought mechanical solutions for administering the spectrum (as anyone who has dealt with loading questions knows). However, in this case there is a real question as to whether a mechanical application will result in good regulation.

My recommendation, regardless of whether you believe that the geographical

standard should be one second of arc or one mile or judged on a case-by-case basis, is that you check now to ensure the accuracy of your license data and correct any mistakes.

In a related decision within Gen. Docket No. 93-252, the FCC has deferred extending the Finder's Preference program to radio common carrier (RCC) channels. One has to wonder whether the FCC deferral arises out of its current problems with this issue, or whether it cannot decide whether it would be in the public interest to sic spectrum-hungry finders on the nation's biggest operators. As the FCC decides issues of parity in regulation, it might do well to even-out the RCC playing field as well.



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Should the FCC allow finders to get a license for channels that are fully constructed and serving the public from the wrong location, or... bend its rules and provide some "wiggle room" for licensees regarding the accuracy of their licensing data?

the FCC employees who have to figure this out, you probably wish the whole matter would go away.

This matter of basing a finder's preference claim on a small discrepancy between licensed geographical coordinates

Duplexers:

In the article "How to use Duplexers: Isolation Requirements," by Brian Henderson in the July 1994 issue, Mr. Henderson had one section titled "How Much Isolation?" In very simple terms, how did he come up with the "total isolation required?"

Tom Klomps
East Metro Communications
Covington, GA

Mr. Henderson's reply:

I received your letter about isolation requirements between transmitter and receiver for duplexer design.

As with any question, there are at least two answers—one the complicated scientific answer, the other a "rule of thumb" guideline.

Scientific method

The first answer is based on what are known as the *transmitter-receiver duplex curves*. These are sometimes available from the manufacturer of the particular radio you intend to use as a repeater. I say sometimes because I commonly ask a manufacturer to provide these curves when ordering equipment.

These duplex curves allow exact calculation of isolation requirements. They are a graphical plot of a transmitter and receiver. The horizontal axis is in megahertz away from the intended receiver frequency. The vertical axis is a relative dB scale of noise produced by the transmitter.

The curve is used to determine isolation requirements.

1. Calculate the frequency difference between transmitter and receiver.

2. Plot this frequency difference on the chart's horizontal axis.

3. Move vertically to intersect the duplex curve itself.

4. Move horizontally to the vertical axis to determine isolation in dB required between transmitter and receiver.

Obviously, the closer together the transmit and receive frequencies, the greater the isolation required. You should end up with a number in the area of 60dB to 90dB. Then, order a duplexer having the required isolation.

The problem with this scientific method of determining isolation is obtaining the duplex curves themselves. When asked, many manufacturers:

- a) do not know what a duplex curve is.
- b) do not know how to plot the duplex curves, let alone supply them for their radio equipment.
- c) will not release these curves to the end customer.

That brings about the second method of determining isolation requirements—the "Good Old Rule of Thumb."

Rule of thumb

If duplex curves are not available, isolation requirements still can be estimated.

1. Determine difference in dB between receiver sensitivity and transmitter output power.

Example—

Transmitter power 100W = +50dBm
Receiver sensitivity 0.35µV = -115.1dBm
Difference (required isolation) = 166.1dB

Note that this calculated isolation is for an on-frequency transmitter. Here is where the "Rules of Thumb" come in.

2. Calculate isolation requirements for the radio. For the VHF band, 138MHz-174MHz, the following is a guideline:

- a) For 300kHz transmit-receive spacing, assume 70dB.
- b) For 500kHz transmit-receive spacing, assume 85dB.
- c) For 1.0MHz or more transmit-receive spacing, assume 100dB.
- d) For 3.0MHz or more transmit-receive spacing, assume 115dB.

Subtract this amount from the calculated isolation required.

Example—using the same transmitter-receiver as above and 1.2MHz transmit-receive spacing.

Isolation required = 166.1dB
For 1.0MHz spacing or more, = -100dB
Additional isolation required = 66dB

This additional isolation is required to operate the transmitter-receiver without receiver desense.

Purchase a duplexer or multicoupler having a minimum of 66dB transmit-receive isolation. This number is available from the manufacturer as part of any duplexer specification.

3. For the UHF band, 406MHz-470MHz, the following is a guideline:

- a) For 3.0MHz transmit-receive spacing, assume 70dB.
- b) For 5.0MHz transmit-receive spacing, assume 85dB.

I hope this answers the question. It is sort of a "fly by the seat of your pants" answer; however, it is reasonably reliable for most applications, considering that scientific documentation is commonly not available.

Brian J. Henderson, P.Eng.
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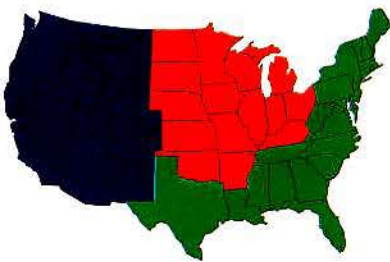
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18 ea. Micor, 155 MHz, T73RTN3100
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2 ea. GE Custom MVP, 47 MHz, CT54AAU33A
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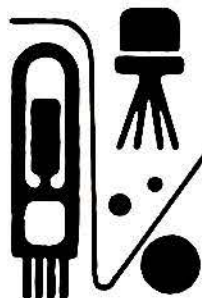
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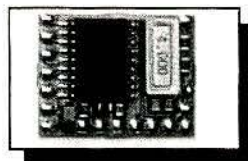
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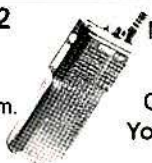
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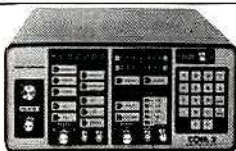


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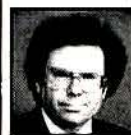
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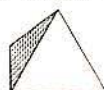


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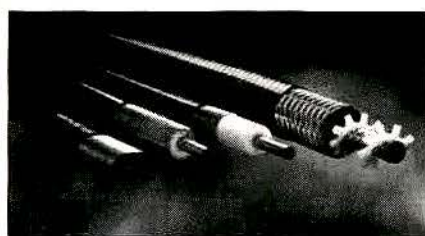
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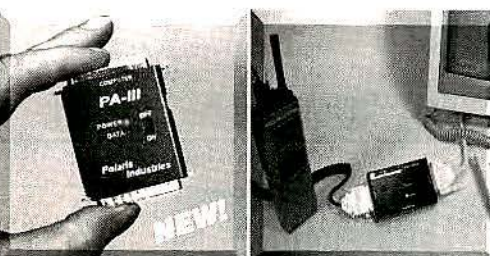
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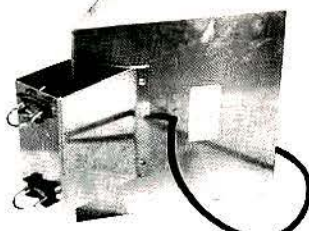
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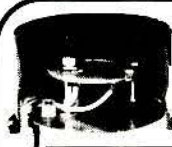
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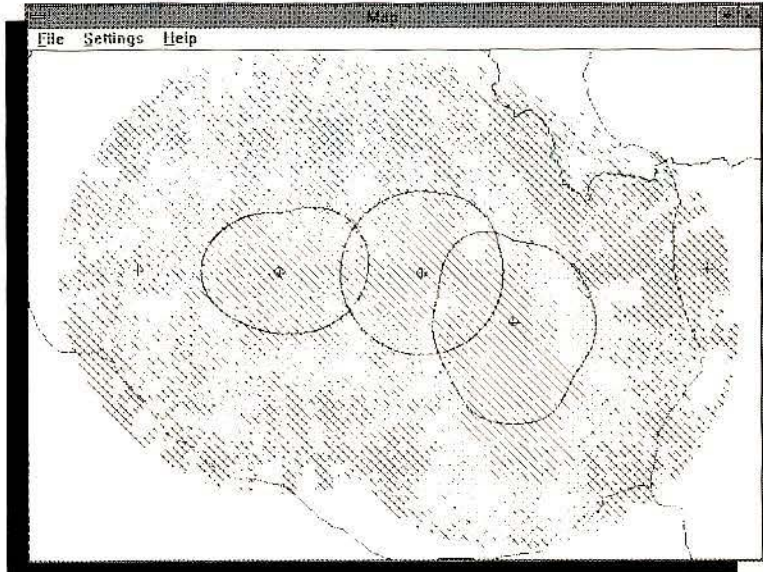
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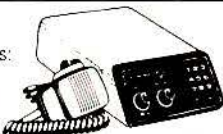
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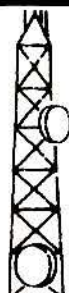
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